RICE UNIVERSITY

Hijacking Generic Space: The Expanded Airport Hub

by

Kelly Barlow

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE

Master Of Architecture

APPROVED, THESIS COMMITTEE:

Douglas Oliver, Director
Professor in Practice, Architecture

Scott Colman, Thesis Coordinator
Senior Lecturer, Architecture

Gordon Wittenburg
Professor of Architecture, Architecture

Sarah Whiting, Dean
William Ward Watkin Professor, Architecture

HOUSTON, TEXAS
MAY 2012

ABSTRACT

Hijacking Generic Space:
The Expanded Airport Hub

by

Kelly Barlow

This thesis examines the formal and programmatic expansion of one of the most efficient generic spaces, the international airport hub, by serving the specific needs of an increasingly common mobile citizen, the medical tourist. International airport hubs are comprised of a network of interlinked corridors where large transient populations are received, held and then dispersed again. The medical tourist is a product of the rapidly increasing cost and specialization associated with medical treatment procedures. Recognizing that the density of airport hubs now rivals that of contemporary city centers, this project expands the capacity of the international airport hub, thus enabling the airport to compete for citizens in a manner similar to cities.

As one iteration of a potential airport expansion system that could serve multiple mobile citizen types, this project exploits the security requirements of an existing airport and an innovative program to hypothesize a new type of airport terminal.

ACKNOWLEDGEMENTS

Acknowledgements and gratitude are due:

To my director, Doug Oliver, for believing in this project before it had any true form, and for providing me with endless encouragement during the design process

To Scott Colman, Albert Pope and Sarah Whiting for their direction and motivation throughout the thesis process, and for their challenge to find an individual voice

To the Rice School of Architecture faculty and students for their continued feedback and input during the thesis process

To the team that helped me finish the last production items: Ying Tao, Sheila Mednick, Sam Biroscak and Peter Stone

To my friends in Houston and beyond, particularly Karin Buchmann, Katherine Hunter, Jessica Lutz, Sue Biolsi, Sara Hieb, Sean Kizy and Alexandra Attie who provided constant inspiration and entertainment during my time in Texas

To my grandmother, Willetta Heising, who inspired in me a deep appreciation for education, and whose support helped to make this project a reality

To Trevor, for being my other half, for supporting me always and for constantly motivating me to meet his intellectual creativity

And finally to my parents, David and Ellen, and sister, Casey, for their support and love, at every hour and every day

TABLE OF CONTENTS

'I suspect that the airport will be the true city of the 21st century. The great airports are already the suburbs of an invisible world capital, a virtual metropolis whose fauborgs are named Heathrow, Kennedy, Charles de Gaulle, Nagoya, a centripetal city whose population forever circles its notional centre, and will never need to gain access to its dark heart.'

-J.G. Ballard, Foreword, *Aerotropolis: The Way We'll Live Next*, 2011.

INTRODUCTION

The contemporary city is polycentric and fully dependent on infrastructural nodes and corridors that serve as connecting devices. Urban decentralization of the past century not only fueled polycentric development, but made possible – if not inevitable – the creation of both generic space and the mobile citizen: areas devoted to consumption and circulation, and contemporary nomads that travel for necessity, work, or leisure (Figures 1 and 2). The city is no longer defined as a static platform for collective exchange, but rather competes for citizens by offering greater services, experiences, and quality of life.[1]

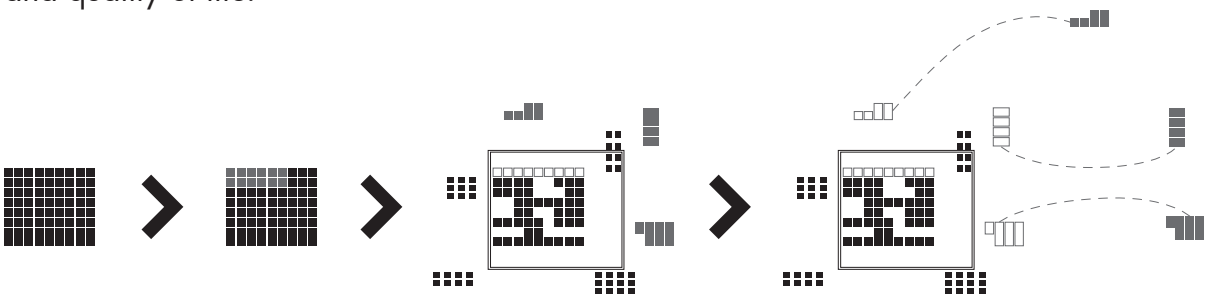


Figure 1
Above is an organizational diagram of urban decentralization.

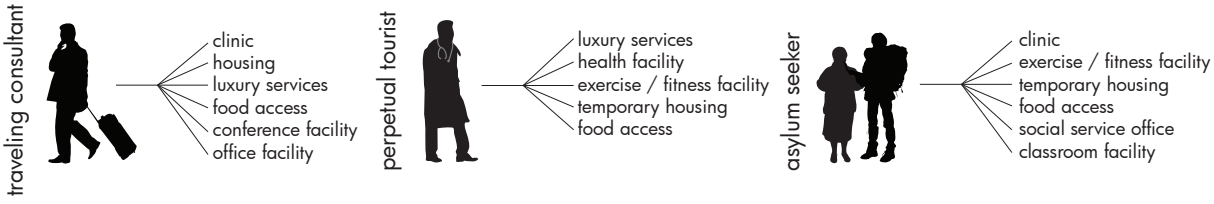


Figure 2
The three separate contemporary nomad types that have developed as a result of globalized development are represented above, with associated program requirements listed alongside.

1 Alan Berger and Charles Waldheim. "Logistics Landscape" *Landscape Journal* 27 (2008): 220.

Generic space has been described by French anthropologist Marc Augé as a 'non-place'.[2] Unlike traditional city centers, Augé argues that these areas are characterized by a suspension of specificity with regard to social relation and collective identity. Although generic space rejects precise identity in favor of extreme efficiency, it is clear that these areas retain a high level of exactness within systems of consumption and circulation in order to function. Far from being completely devoid of value, these places tend to replace social distinctions with logistical strategies to create space that is highly reproducible.[3] The contemporary airport has evolved into one of the most specific, exceedingly reproducible, and densely populated 'non-places' in existence (Figure 3).

Figure 3
The photographs above are examples of existing international airports, from left to right PHL, IAH, PHL.

This project accepts the fragmented contemporary city and seeks to investigate and expand the existing spatial and programmatic conditions of one of its infrastructural nodes, the airport terminal. Rather than treat the airport as solely a piece of infrastructure serving the city, this project categorizes it as a piece of infrastructure

2 Marc Augé. *Non-Places: An Introduction to an Anthropology of Supermodernity*, J Howe trans (London: Verso, 1995)

3 Alan Berger and Charles Waldheim. "Logistics Landscape" *Landscape Journal* 27 (2008): 220.

that has gained the ability to act as a competing urban element, vying for residents. In her article, "Fresh Field," Keller Easterling claims that global infrastructure is a new territory for architectural development. These networks, she argues, provide architects the opportunity to create spaces that possess the disposition to, "locate activity not in movement or event, but in relationship or relative position."[4] This indicates the site of the architectural project has shifted away from a steady urban center. Coupled with infrastructure, architecture is no longer static, but instead has the capacity to both modify and be modified by the actors and forces within its environment. This project seeks to register and provide for the existing density of the international airport hub while simultaneously influencing its capacity to grow and proliferate.

Inside airport terminals a kind of 'transit-life'[5] has developed, redefining borders, time and geography. Technological theorist and architect Paul Virilio notes that increased speed in human and data transport has the ability to completely alter human understanding of physical space, morphing it from one rooted in geography to one grounded in 'chronography' (which measures distance using units of time).[6] It is within the transit-centered life of the airport that opportunities to engage and transform specific contemporary nomads arise.

Expanding the program housed within the terminal itself permits existing occupants to alter their relationship with the airport while maintaining functionality. The largest international airport hubs have already begun to expand services to include activities

4 Keller Easterling, "Fresh Field" *Coupling: Strategies for Infrastructural Opportunism*. (New York: Princeton Architectural Press, 2011) 10-11.

5 Gillian Fuller and Ross, Harley, *Aviopolis: A Book About Airports*. (London: Black Dog Publishing, 2004) 38.

6 Paul Virilio and Sylvere Lotringer. *Pure War*. (New York: semiotext(e), 1983).

Figure 4
Typical airport program is listed below, followed by examples of expanded program offerings at five of the largest international airport hubs.

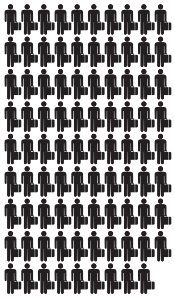
Typical programmatic requirements for hub airport...

- ground transportation
- designated departure area
- designated arrival area
- baggage drop-off / claim
- security check-points
- currency / banking services
- business service stations
- first aid and ems service
- bars
- restaurants
- shopping / duty-free

Diversified program that is currently offered at large airport hubs...

ATL
Hartsfield-Jackson Int'l Airport, USA
opened to public 1946

total number of passengers 2010:

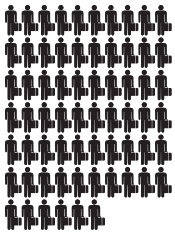


89,331,622

- primary care clinic
- family area
- day rest
- public art program
- designated pet area
- pharmacy

DFW
Dallas Fort Worth Int'l Airport, USA
opened to public 1973

total number of passengers 2010:

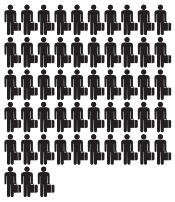


65,881,660

- salon
- family area
- day rest
- public art program
- pharmacy

FRA
Frankfurt am Main Airport, Germany
opened to public 1958

total number of passengers 2010:

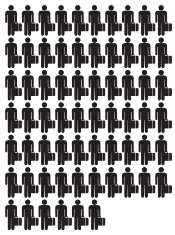


53,009,221

- salon
- play area
- day rest
- pharmacy
- casino
- bike path
- exterior terrace

LHR
London Heathrow Int'l Airport, UK
opened to public 1953

total number of passengers 2010:

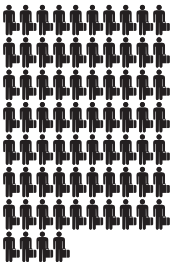


65,881,660

- salon
- family area
- day rest
- public art program
- pharmacy

PEK
Beijing Capital Int'l Airport, China
opened to public 1958

total number of passengers 2010:



73,891,801

- salon
- family area
- day rest
- play area
- fitness center
- luggage storage
- interior garden

not directly related to travel, but instead aligned with quality of experience (Figure 4). By directing the program development within a single terminal expansion project toward a specific contemporary nomad, a new species of terminal can be established within the lineage of international airports. Innovative services that are defined by measures of time can be directly inserted into existing airport hubs - some structured to fit within the period of a layover, others fashioned to entice travelers to spend additional time within the terminal itself. In this way, the expanded terminal not only serves passengers scheduled to pass through the airport for logistical reasons, but encourages passengers normally moving through alternate airport hubs to redirect their flights in order to take advantage of services that fit their lifestyle.

This project serves as a case study for a potential system of airport terminal development. It isolates a specific contemporary nomad, the medical tourist, and creates a world within the terminal that caters to this traveler.

THE AIRPORT HUB

In 1978 President Jimmy Carter signed the Airline Deregulation Act, eliminating the government's complete control over air travel. This freed commercial aviation companies to set both their fares as well as their flight patterns.[7] Prior to this act, many flights were direct, from one destination to the another. Deregulation drastically altered business models and lead to a more efficient spoke-and-wheel hub system of flight, which enabled a greater number of flight destinations using fewer planes (Figure 5).

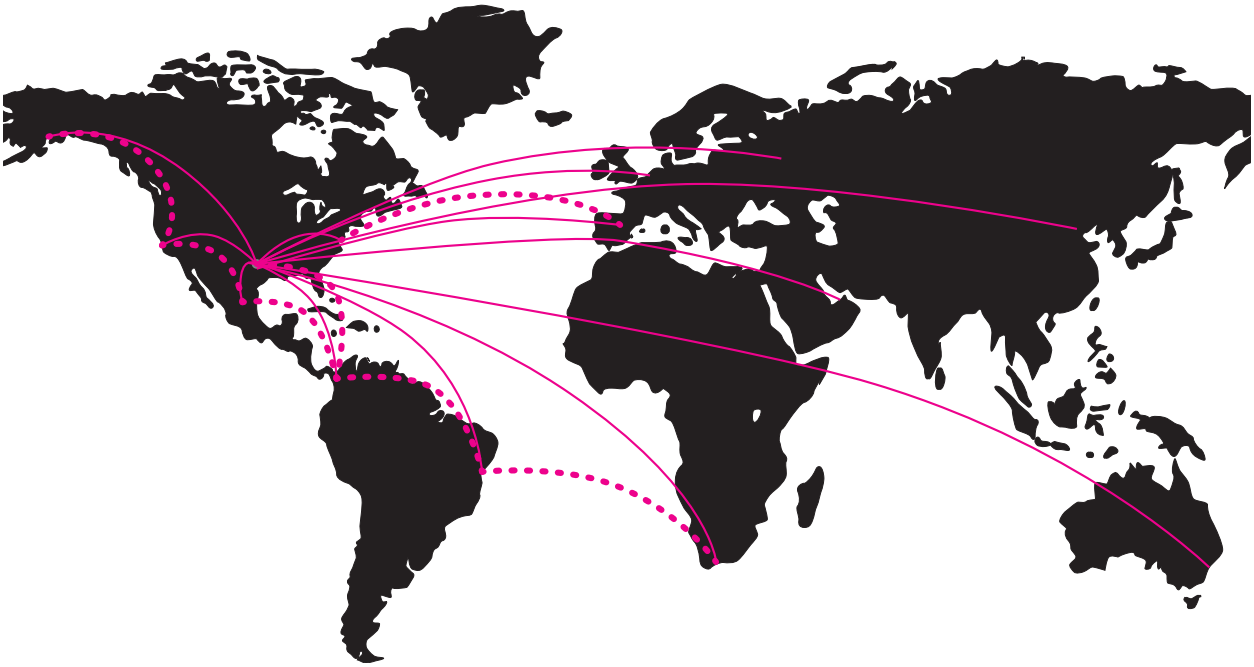


Figure 5
In this map the linear progression of hypothetical direct flight paths (dashed magenta) are contrasted with the radial evolution of hypothetical hub flight paths (solid magenta).

7 Greg Lindsay and John D. Kasarda. *Aerotropolis: the way we'll live next.* (Farrar, Strauss and Giroux, 2011) 94.

In a short amount of time air travel became the primary mode of transportation used to travel long distances, and the concept of the layover was introduced. In their recent publication, Greg Lindsay and John Kasarda describe the lack of sensory stimulation during a layover within an airport hub as:

> ...a limbo in which physics and human experience are no longer applied. They're amnesiac places with no future and no past, only a continual present offering the same choices - flights, duty-free, and fast food - day after day after day.[8]

In an airport hub the constant flow of arrival and departure traffic ensures that there is always an audience, always a public. The terminal is a transient space that travelers are obligated to inhabit, but have difficulty remembering. The space in one terminal looks similar to the last, containing horizontal configurations of the same program repeated again and again, ad infinitum.

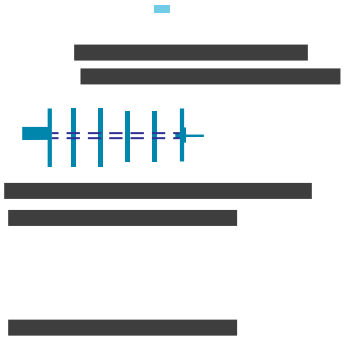
Due to the logistical exactness required for proper airport function, the design and construction of terminal buildings are primarily attentive to the strategic access and maintained separation of airside and landside activities (Figure 7). The increased number and size of terminal buildings at airport hubs has generated three specific terminal designs: the offset linear corridor, the continuous linear corridor, and the isolated figure (Figure 6). Though different in plan, all three terminal types are aligned in their desire to establish a maximized single loaded corridor condition, which in turn enables a maximum number of loading gates. The variation in plan, however, does not greatly effect the development of the terminal section (Figure 6).

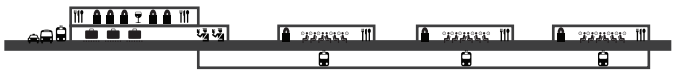
8 Greg Lindsay and John D. Kasarda. *Aerotropolis: the way we'll live next.* (Farrar, Strauss and Giroux, 2011) 96.

Figure 6
The diagrams below illustrate the possible variation in plan configuration without section variation. All plan configurations aim to increase surface area in order to accommodate the taxi and loading of planes. In the three sections shown, baggage and ticketing services are located at the ground, while commercial and restaurant services are positioned alongside the waiting area of the concourse level. Trains and shuttles that connect individual terminals can be found at multiple levels.

offset linear corridor

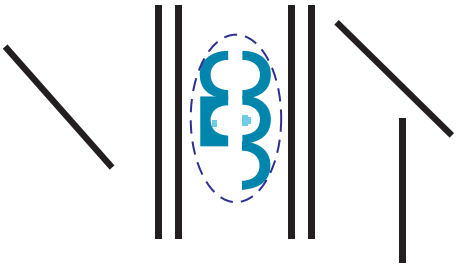
Hartsfield-Jackson International Airport, USA
opened to public 1946





continuous linear corridor

Dallas Fort Worth International Airport, USA
opened to public 1973



isolated figure

London Heathrow International Airport, UK
opened to public 1953

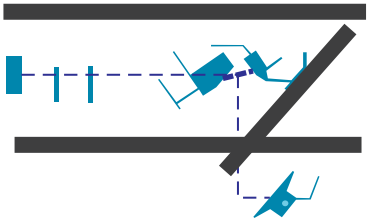
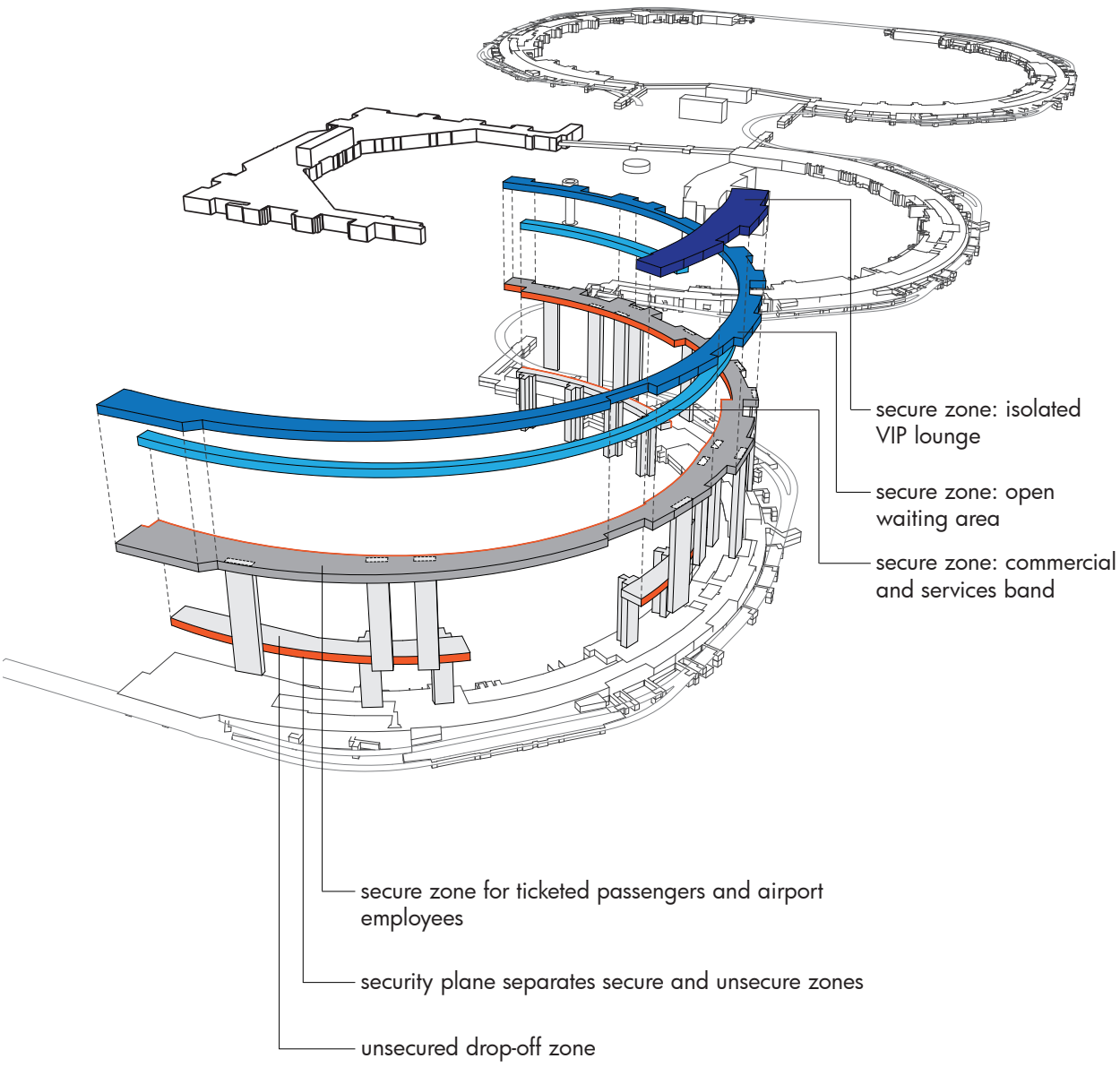


Figure 7
Below is an axonometric drawing depicting the separation of secure and unsecure space, which constitutes the basic anatomy of an airport terminal.



Strict rules established by the Federal Aviation Administration limit the construction of building expansions within designated airside zones in order to maintain safety and aircraft control standards. Without the ability to alter the boundaries of the building envelope on the airside of the terminal, it is necessary to explore opportunities for expansion on the landside of the terminal or in section.

THE MEDICAL TOURIST

The contemporary nomad is a product of the shifting economic and industrial policies and practices of the past century. As highly mobile citizens, these people are the primary occupants of the generic space that dominates infrastructural corridors. By examining the services and experiences frequently utilized by these mobile citizens, three general nomadic types can be identified: the traveling consultant, the perpetual tourist and the asylum seeker. This project recognizes that all three nomadic types spend many hours in airports, yet chooses to concentrate program expansions within this project to serve a specialized nomadic type - the medical tourist.

The medical tourist is a consequence of the rapidly increasing cost and specialization associated with medical treatment procedures that continue to adapt and expand with technological innovation. The term medical tourist is one traditionally limited to patients traveling internationally for surgical procedures. In this project I have expanded the title to include patients in need of chronic care, doctors and practitioners participating in technological training conferences, patients in need of physical therapy and travelers seeking spa treatments.

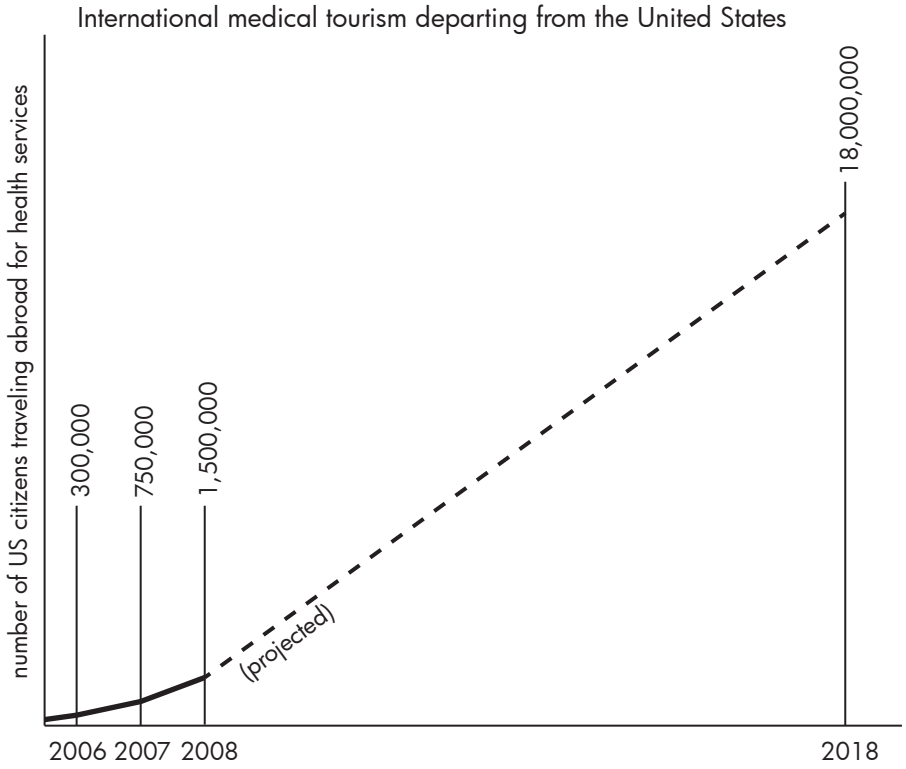
As indicated in Figure 8, it is increasingly common for patients seeking medical services to travel outside their home region or outside a traditional medical setting to receive treatment.[9] The *Active Design Guidelines* (published in 2010 by New York City) note that the largest public health epidemic facing the United States today

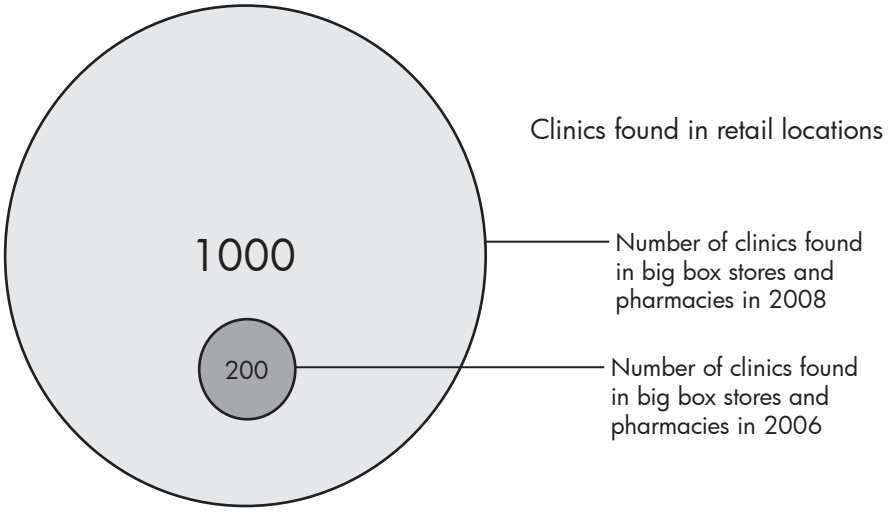
9 Allison Van Dusen, "U.S. Hospitals Worth The Trip" Forbes.com < http://www.forbes.com/2008/05/25/health-hospitals-care-forbeslife-cx_avd_outsourcing08_0529healthoutsourcing.html > (29 May 2008)

is obesity and its related chronic diseases. Unlike infectious diseases, most chronic diseases require constant health care management, which greatly increases the odds that travelers will be limited by treatment dependency and lack of resources in coming years.[10]

10 Irene Cheng, ed. *Active Design Guidelines - Promoting Physical Activity and Health in Design*. (New York: City of New York, 2010) 6, 14

Figure 8
The two diagrams below indicate an increase in the number of United States citizens seeking health care services outside traditional hospital and clinic settings. The first graph exhibits increased medical travel to other countries, while the second figure demonstrates the proliferation of clinics within shopping centers (data used to create graphics are from Linda Johnson's article, "Americans look abroad to save on health care - medical tourism could jump tenfold in next decade").





TECHNICAL CONSTRAINTS

ENVIRONMENT

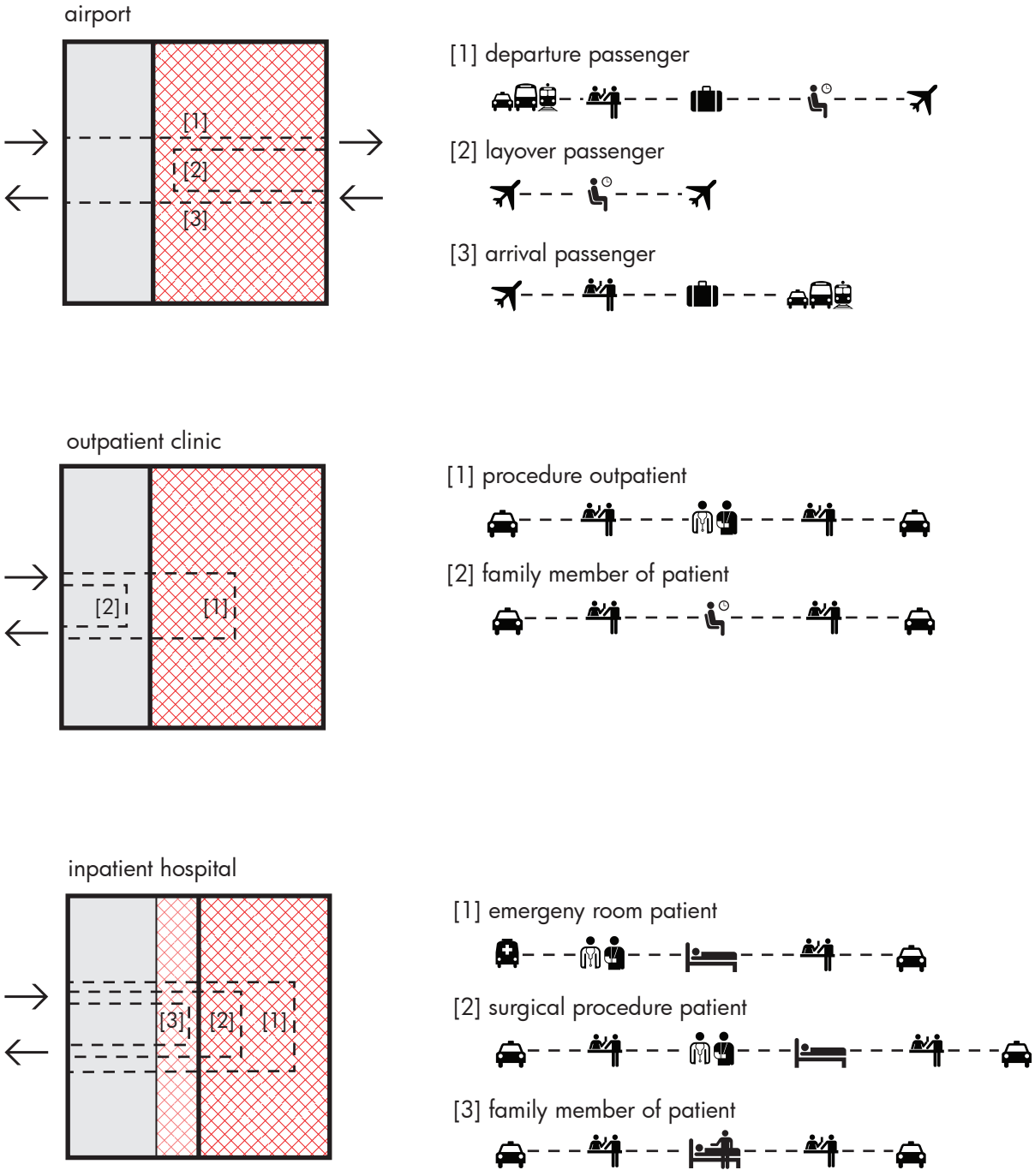
The mechanics of aircraft engines dictate that large amounts of noise are generated within the bounds of an airport. As a jet powered plane takes off a runway it produces roughly 150 decibels of noise (by contrast a rock concert produces only 120).[11] The construction of buildings for human occupation within airport grounds requires the use of supplemental insulation and noise canceling practices. To create a space for extended occupation, however, additional care must be given to devise a system or barrier for mitigating excessive exposure to high noise levels.

SECURITY

Areas of secured space are an important component of both infrastructural and medical facilities. When traveling, as when visiting a doctor, one must follow a prescribed itinerary. Appointments are made in advance and tickets are purchased. At airports and at health facilities a check-in procedure is completed prior to permitted entry into a secure zone. Although secured space is an important component of both premises, the division between secure space and the unsecured space is often thin – comprised of a single wall with strategic entrance and exit points. The diagrams in Figure 9 contain sample itineraries for travelers and patients at an airport, an outpatient clinic and an inpatient hospital. The itineraries presented alongside the medical facilities both start and end within unsecured space; it is only the itinerary of the 'layover passenger' that can enter and exit a secured zone without moving through unsecured space.

11 Center for Hearing and Communication. "Common Environmental Noise LevelsFactsheet" Noise Center n.d. <http://www.chchearing.org/noise-center-home/facts-noise/common-environmental-noise-levels> (2012)

Figure 9
Below are diagrams of secure and unsecured space for three separate facilities. To the right are sample itineraries for either travelers or patients, depending on the facility diagramed. The program of the itinerary is displayed under the user type, and the pathway that would be traveled between secure and unsecured space is delineated within the diagram to the left.



SITE

The expanded airport terminal proposed in this project could situate itself within any international airport hub. This project anticipates its migration to other airports and distant cities to better serve the specific needs of the contemporary nomad type prevalent in that location. As one iteration of a potential system that targets the needs of a specific nomad, the expanded terminal catered to the medical tourist is sited in the Dallas - Fort Worth Metroplex.

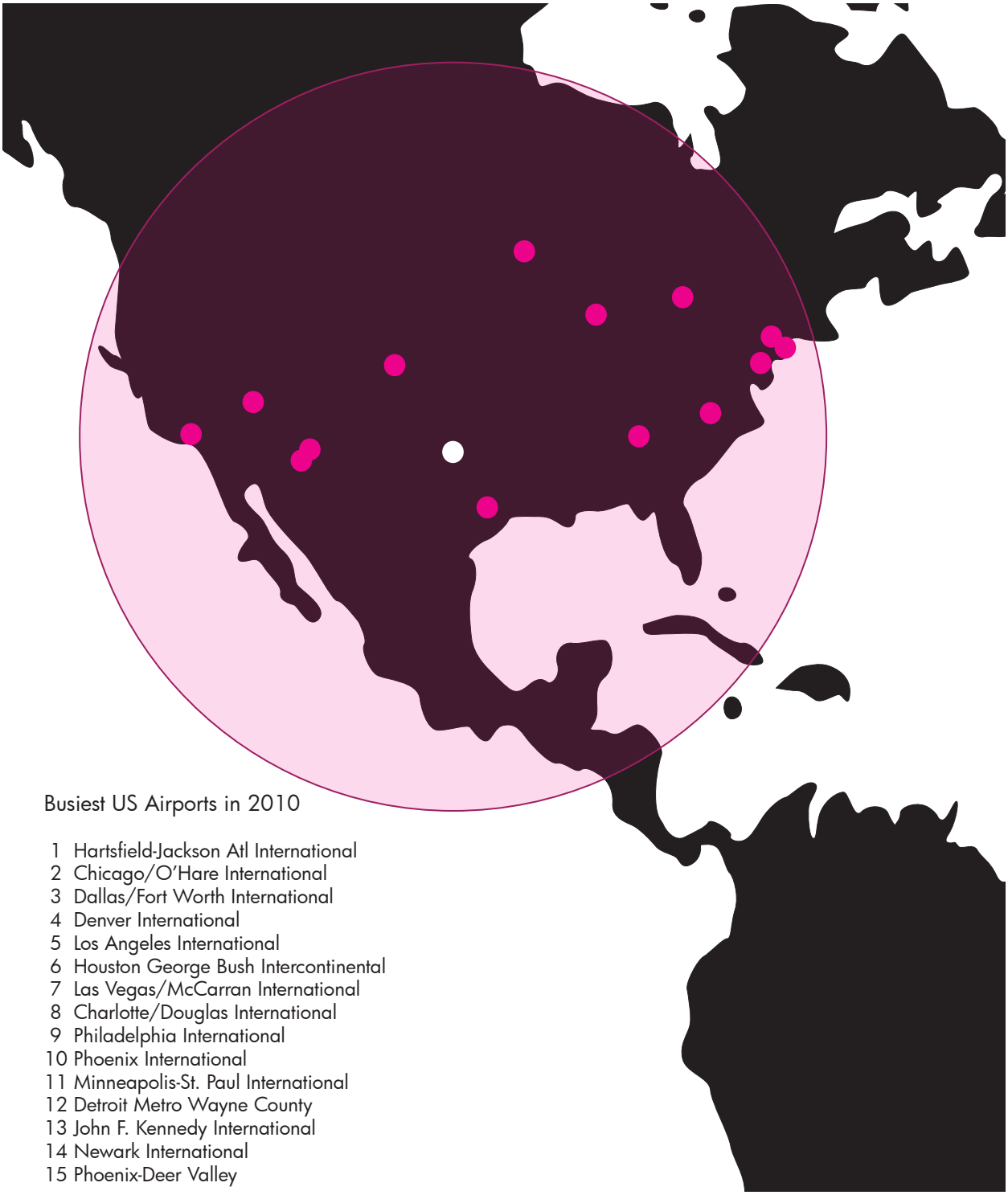
Located directly between the city limits of Dallas and Fort Worth, the Dallas Fort Worth Airport (DFW) serves roughly 60 million passengers annually.[12] The airport is a regional transportation hub, but is also situated in a strategic location, allowing it to connect the entire United States (Figure 10). The DFW terminal buildings are a series of semi-circular bars designed to connect parking areas to departure gates with ease.[13] There are currently five operating terminals, one of which is dedicated solely to international travel. DFW airport is unique in that it is one of only two airports in the US to already extend the boundary of secured space to include a hotel on its premises.[14]

12 Dallas Fort Worth International Airport. "DFW Fast Facts" Visitors Guide n.d. <http://www.dfwairport.com/visitor/P1_009559.php> (2012)

13 James Russell "Terminal D Dallas/Fort Worth Dallas, Tx," *Architectural Record* 193, no. 10 (2005): 166

14 Dallas Fort Worth International Airport. "DFW Fast Facts" Visitors Guide n.d. <http://www.dfwairport.com/visitor/P1_009559.php> (2012)

Figure 10
On this map of the United States the location of DFW airport is signified with a white circle; fourteen of the busiest US airports are indicated with magenta circles (data used to create graphic are from the *Administrator's Fact Book* produced by the US Federal Aviation Administration, 2011). The large light pink circle indicates roughly a 4 hour flight circumference around DFW, demonstrating its strategic location between the coastal areas of the country which enables easy access.



Busiest US Airports in 2010

1 Hartsfield-Jackson Atl International
2 Chicago/O'Hare International
3 Dallas/Fort Worth International
4 Denver International
5 Los Angeles International
6 Houston George Bush Intercontinental
7 Las Vegas/McCarran International
8 Charlotte/Douglas International
9 Philadelphia International
10 Phoenix International
11 Minneapolis-St. Paul International
12 Detroit Metro Wayne County
13 John F. Kennedy International
14 Newark International
15 Phoenix-Deer Valley

THE EXPANDED AIRPORT HUB

The Expanded Airport Hub explores the spatial and qualitative implications of embedding one world within another. By leveraging the restrictions and boundaries of both air travel and health-related program, this thesis expands the typology of the terminal and seeks to change the way the airport relates to its subjects. The Expanded Airport Hub utilizes techniques of insertion to step across the existing concourse where efficiency must be maintained, and deploys methods of erosion within the existing concourse ceiling to expose the newly created world above.

The expansion is comprised of four basic elements: levels of secure program, structural security columns, sculptural atriums and a protective skin. Together these elements expand the secured space of the existing terminal, providing additional check-points as users move vertically to access programs and spaces that require longer stays within the expanded hub. Ramping floor plates, each with its own security designation, are used to create wedge shaped volumes that are accessible and easy to maneuver while recovering from a medical procedure (Figures 11 + 14). The building mass is embedded above a busy train station and into the existing concourse level of Terminal C; it hovers directly over the terminal's northern end, directly facing Terminal D (Figure 12).

The Expanded Airport Hub produces a transformed terminal condition that relieves passengers of the experience of the oppressive corridor in the existing concourse level. Given the option to float above the concourse into volumes with sectional and material variation, medical tourists and unassuming travelers alike stow their luggage and escape the endless waiting area at the gates.

Figure 11
The Expanded Airport Hub rotates the security sequence of the medical office and the airport to make use of the undervalued terminal section. To the right are sample itineraries of various travelers through the expanded terminal.

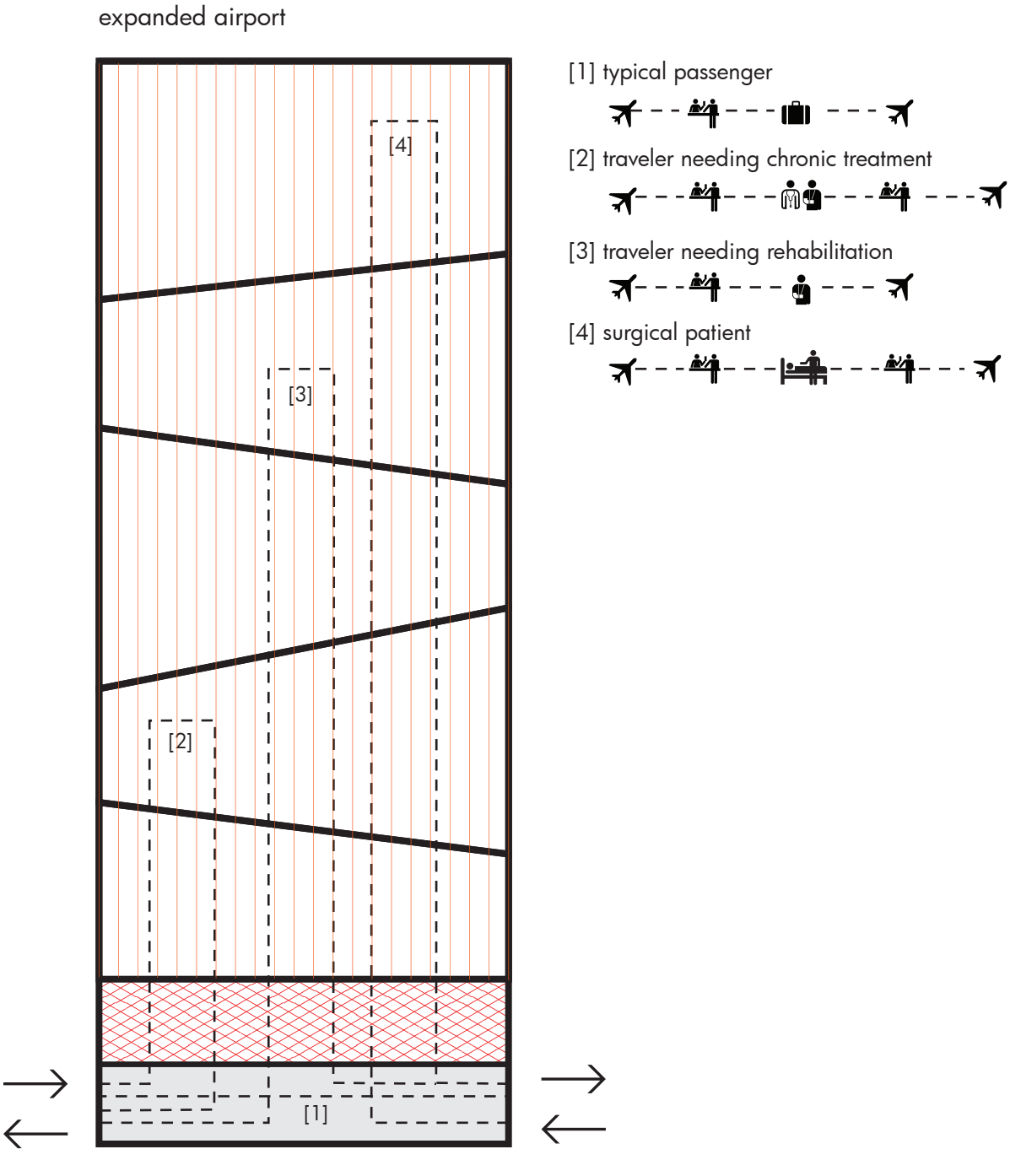
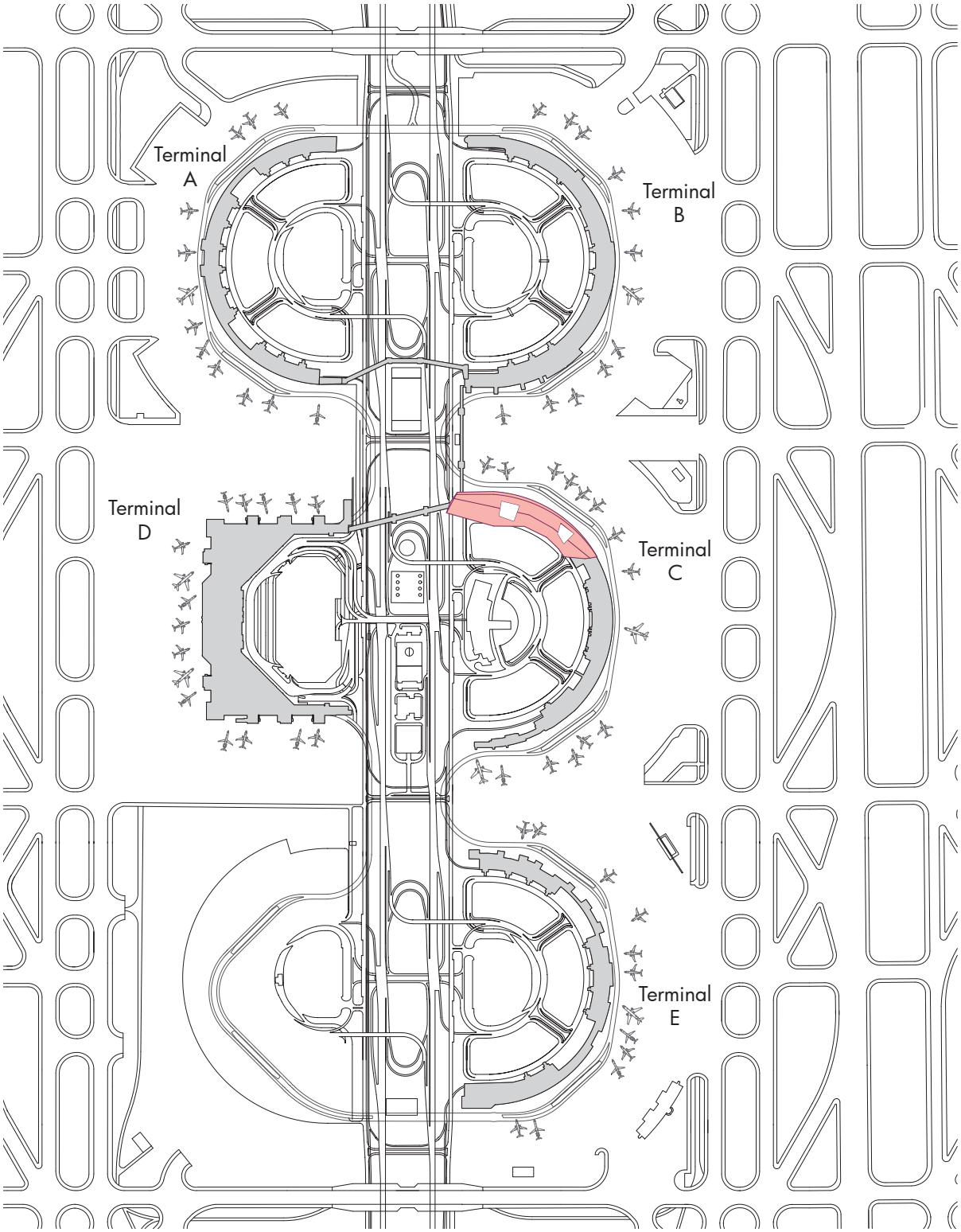
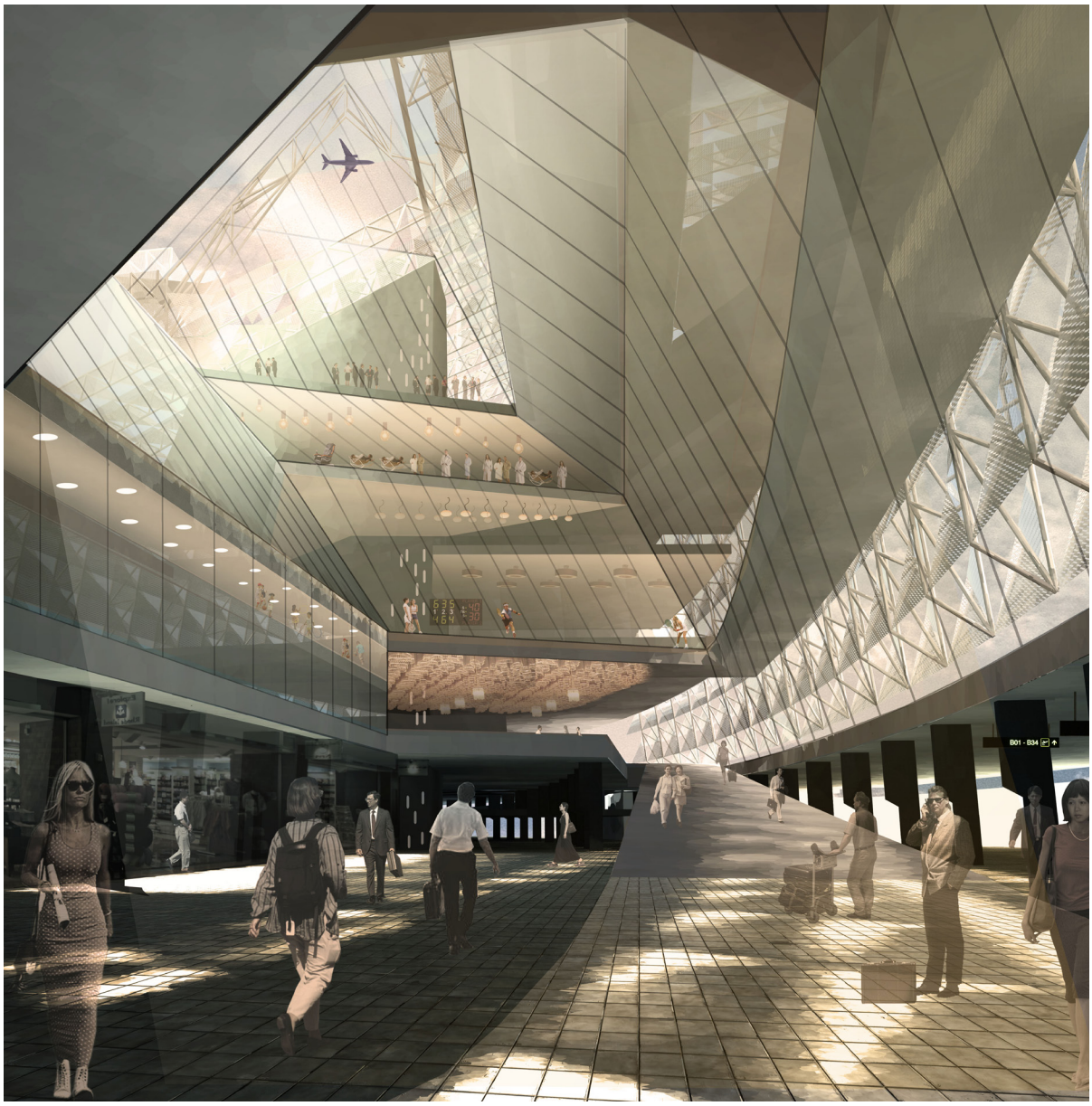
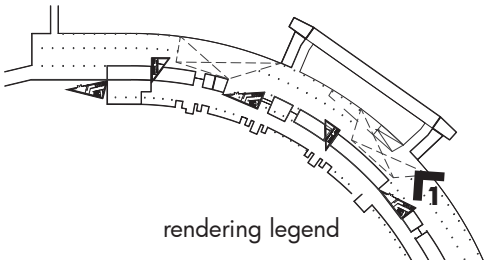


Figure 12
Below is the site plan of DFW airport with the location of the Expanded Airport Hub highlighted in orange. The expanded area is situated at the center of the airport to ensure easy access from every terminal; it is directly across from Terminal D, which is dedicated to international travel.





Rendering 1
Pictured here is the concourse level of Terminal C, directly under an atrium at the entrance ramp to the expanded area.



rendering legend

The program of the Expanded Airport Hub is organized through forging a direct relationship between duration and security. Activities that take less time are more accessible, whereas activities that require more time necessitate a pre-arranged appointment. Travelers seeking medical services within the expanded hub have the option of coordinating their layover with their services or extending their stay within the terminal.

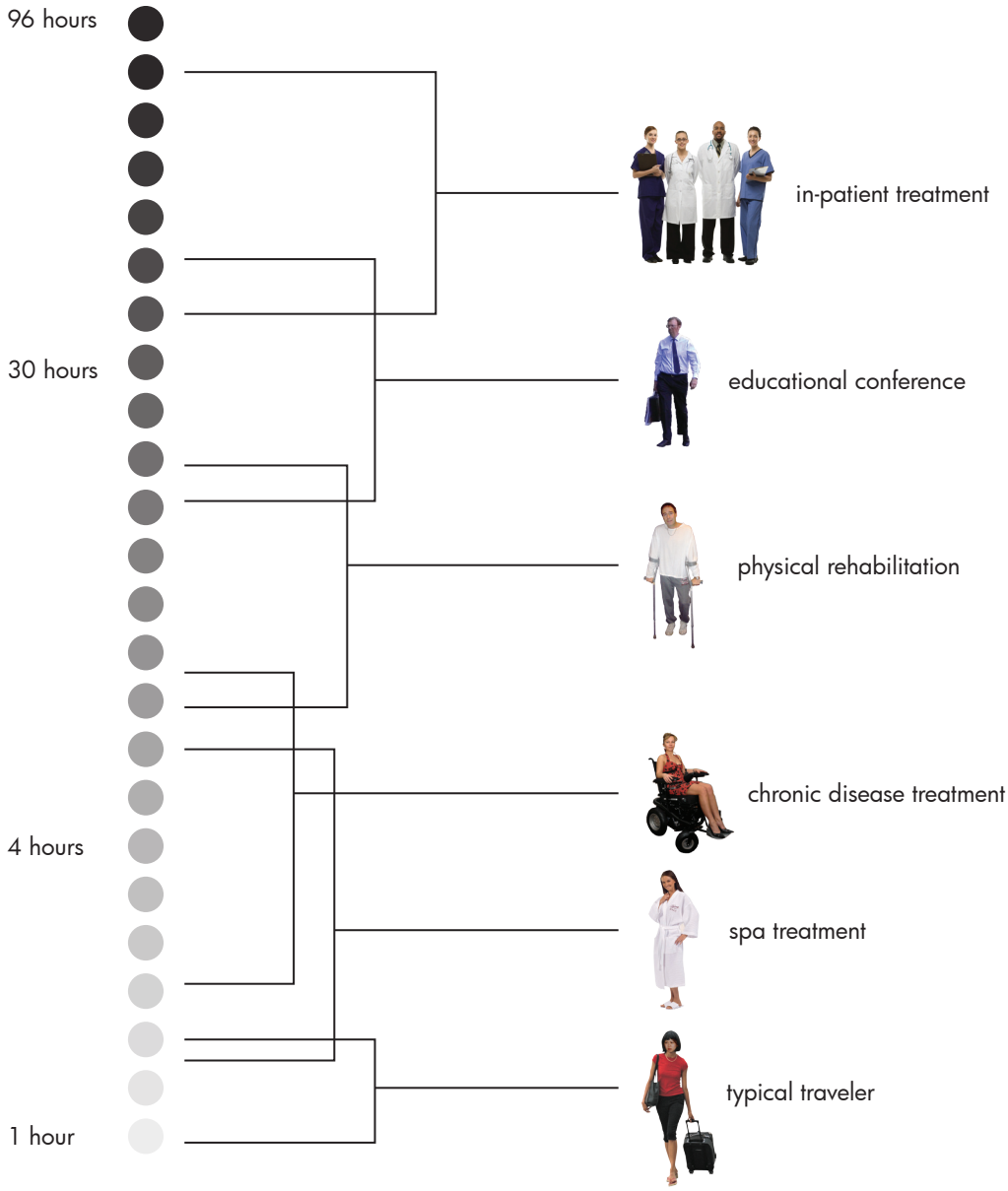
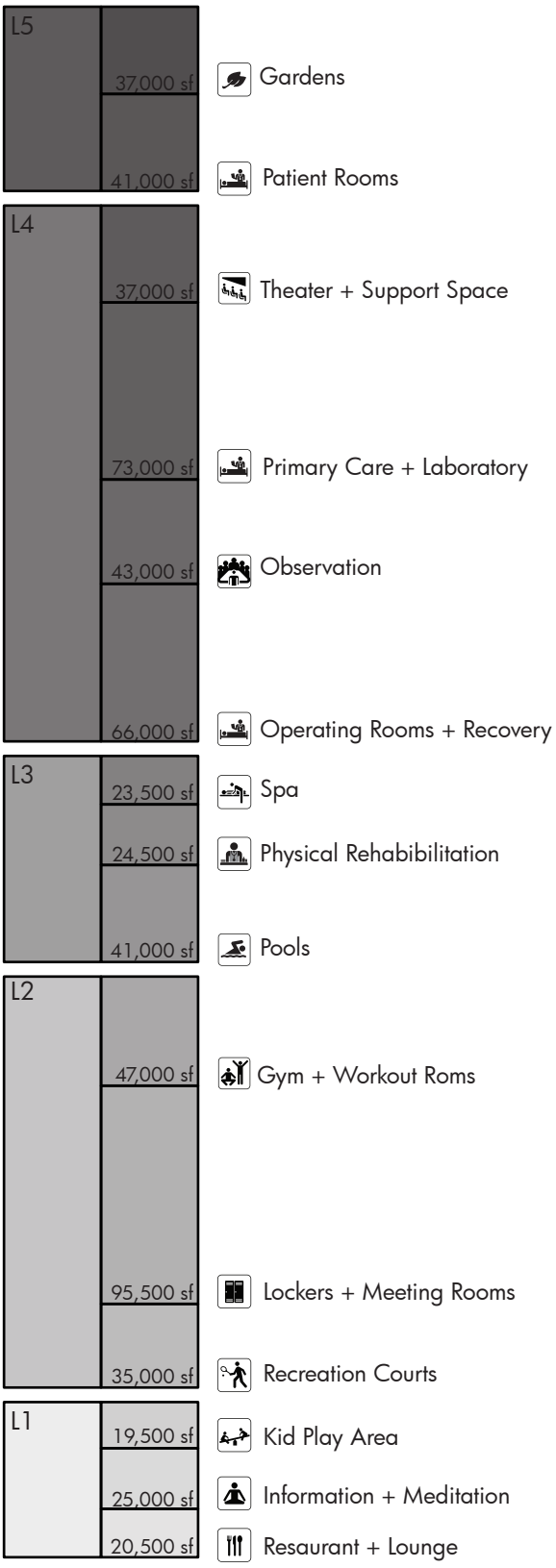


Figure 13
The diagram above illustrates the correlation between specific user types and their associated services in relation to time spent within the expanded terminal.

Figure 14
The diagram to the right displays the program divisions and their respective square footage areas within each level of the terminal expansion.

The Expanded Airport Hub alters the terminal typology, offering travelers something more than an infrastructural corridor. Passengers with limited or no medical needs make use of the recreation and meditation areas, to relieve the stresses of air travel. Passengers requiring or seeking medical care during travel alter flight patterns to make DFW their preferred connecting airport. And patients and health professionals interested in meeting at an accessible location for specific treatment procedures use the expanded terminal as an extension of their medical practice. In this way, the expanded terminal becomes magnetic – pulling patients, professionals and health educators to one location. The Expanded Airport Hub facilitates and eases the exchange of services and ideas.



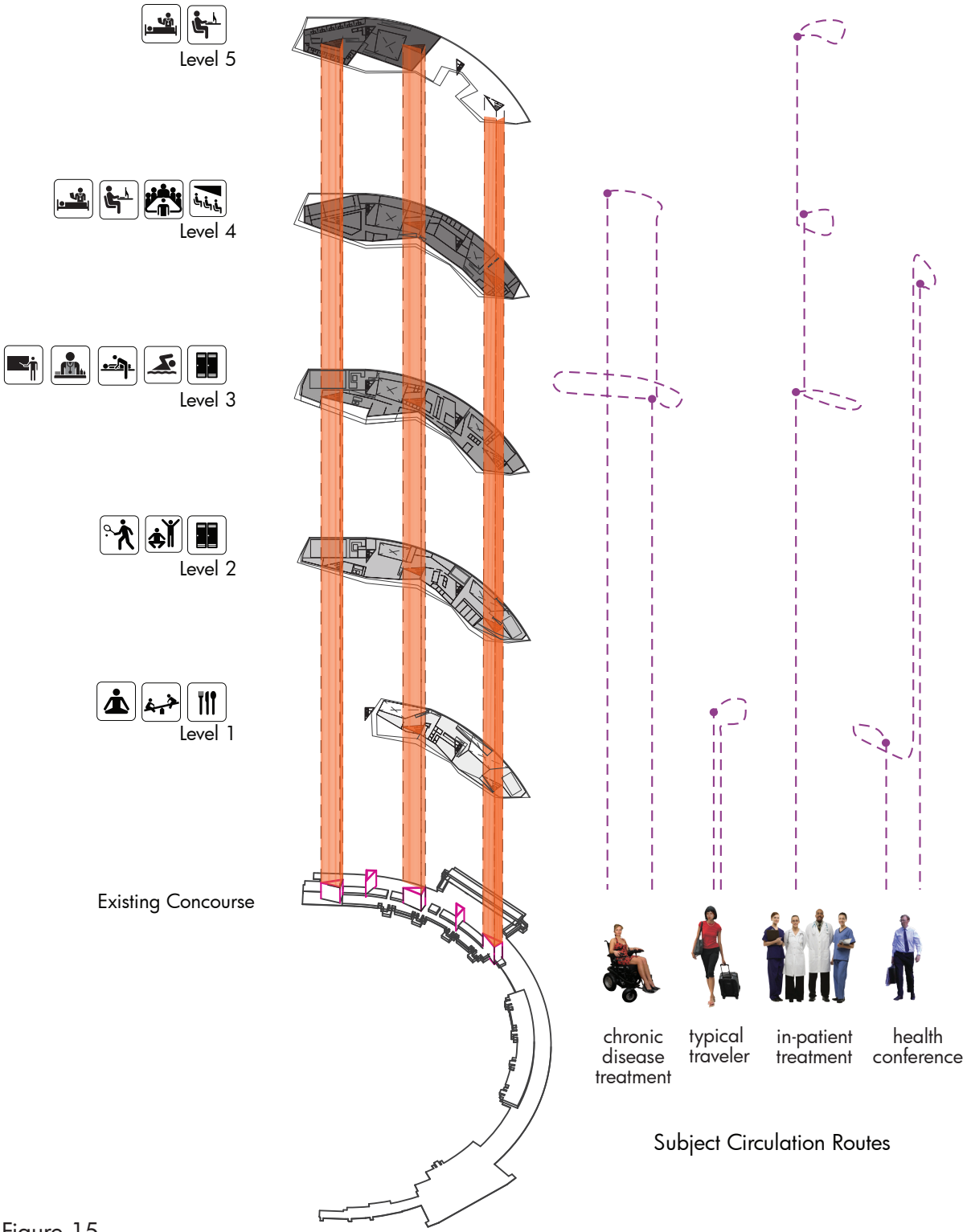
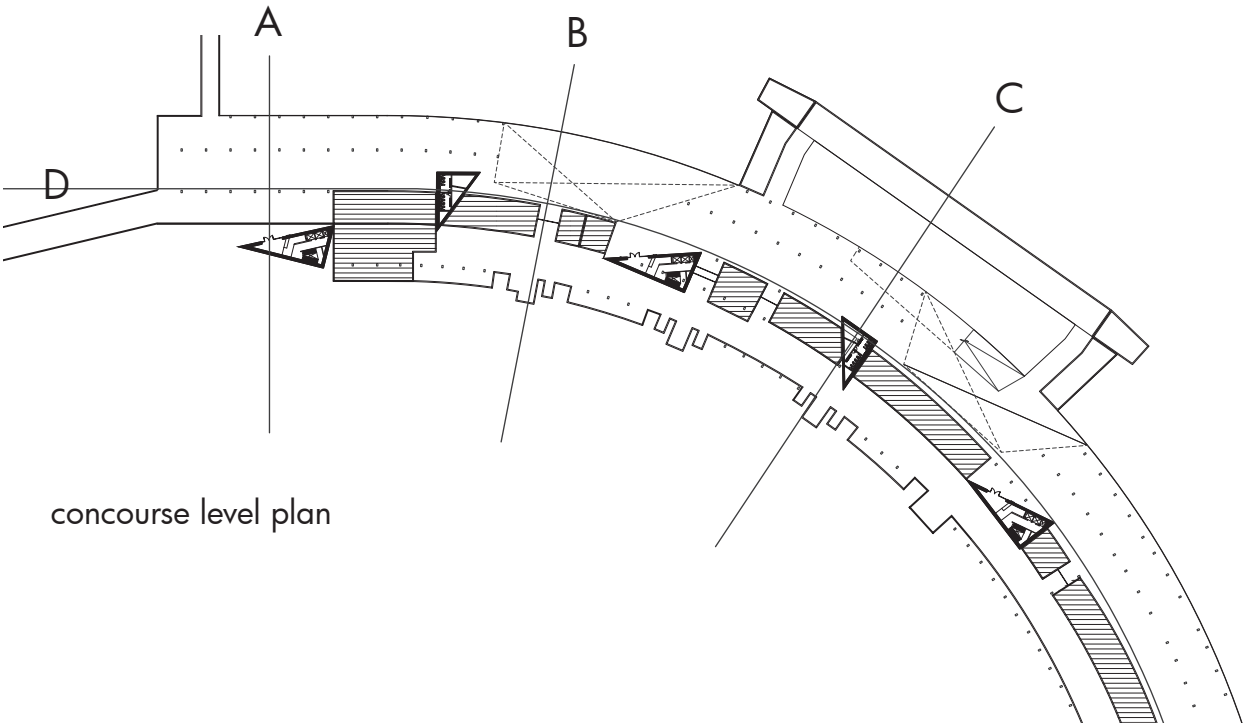
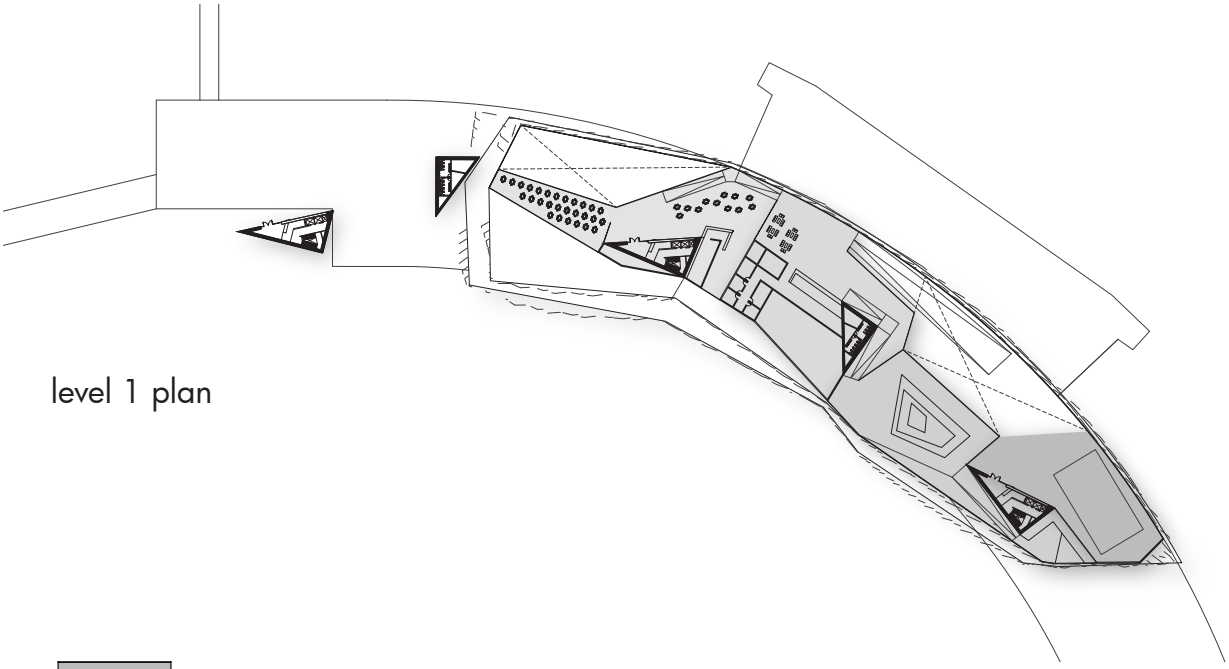


Figure 15
Above, an exploded axonometric drawing highlights the paths of the structural security cores that move travelers vertically from the existing terminal and through the expanded area. To the right, sample circulation routes through the building illustrate security check-points with a darkened circle.



concourse level plan



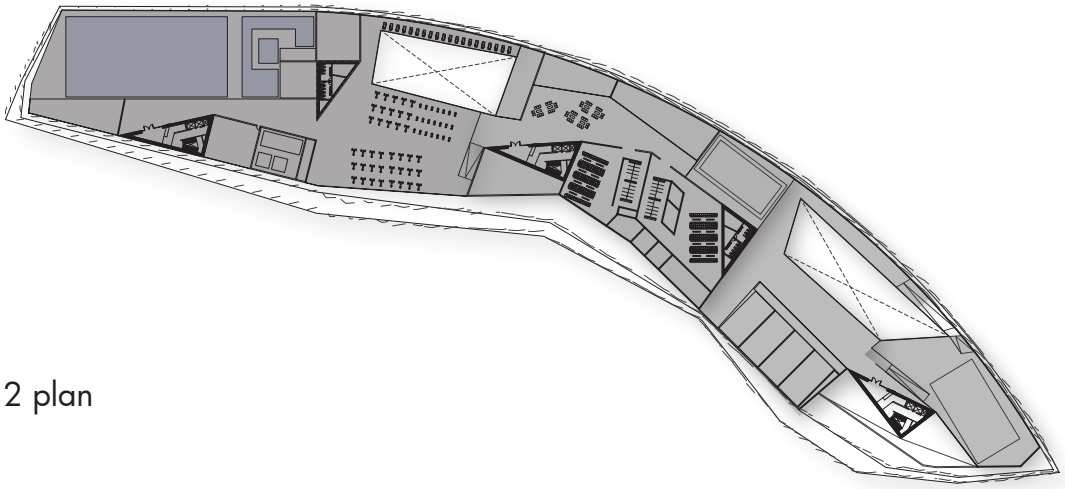
level 1 plan

recreation courts
kid play area
information + meditation
restaurant + lounge
existing concourse shops

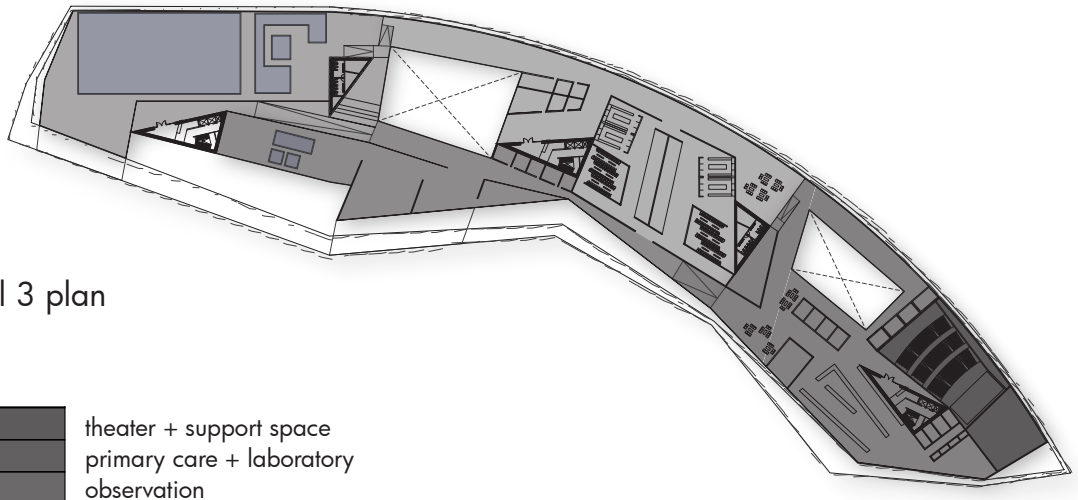
N

0′ 50′ 150′ 300′

* please see appendix for enlarged plans and sections



level 2 plan



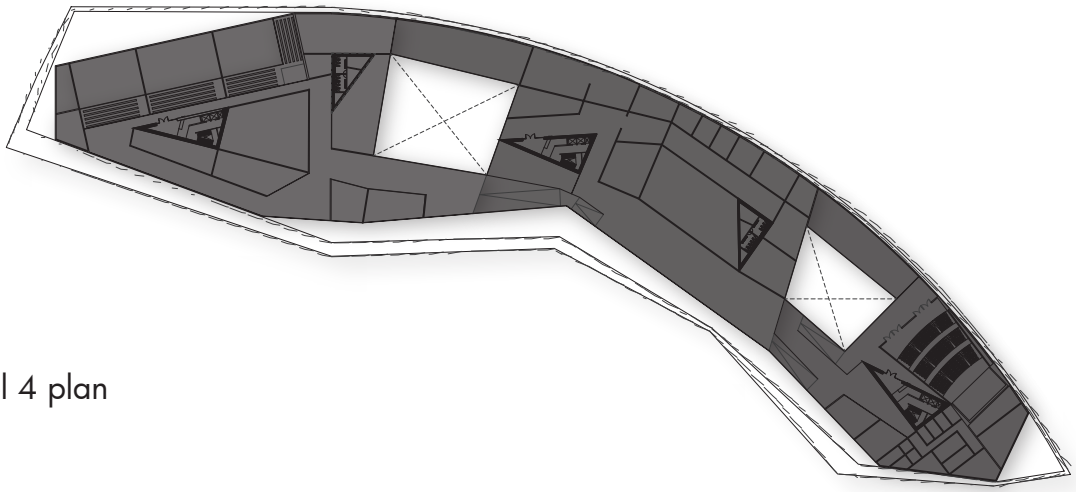
level 3 plan

theater + support space
primary care + laboratory
observation
operating rooms + recovery
spa
physical rehabilitation
pools
gym + workout rooms
lockers + meeting rooms
recreation courts

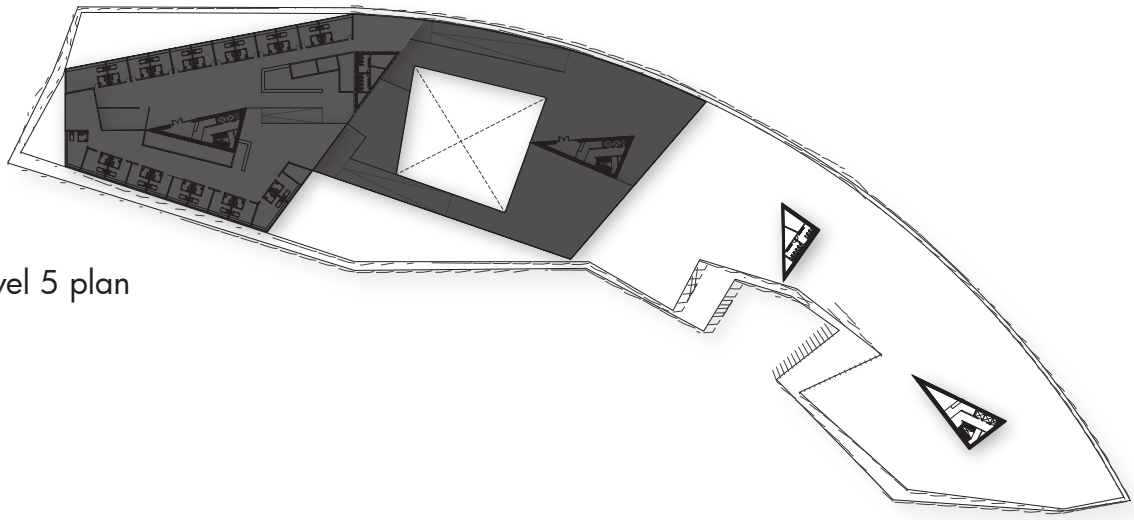
N

0′ 50′ 150′ 300′

* please see appendix for enlarged plans and sections



level 4 plan



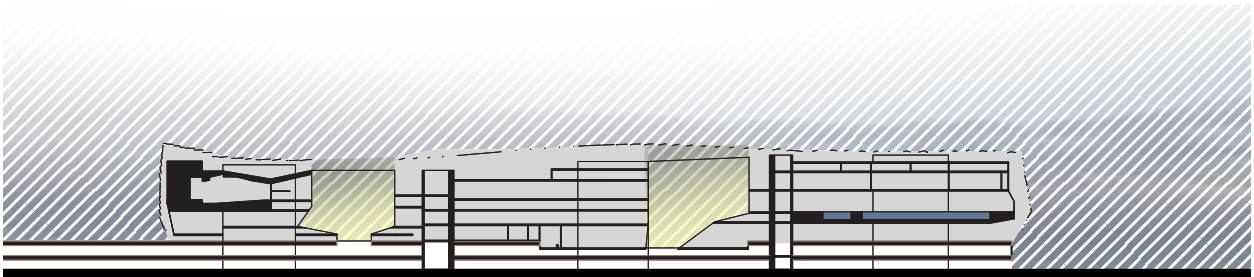
level 5 plan

gardens
patient rooms
theater + support space
primary care + laboratory
observation
operating rooms + recovery

0′ 50′ 150′ 300′

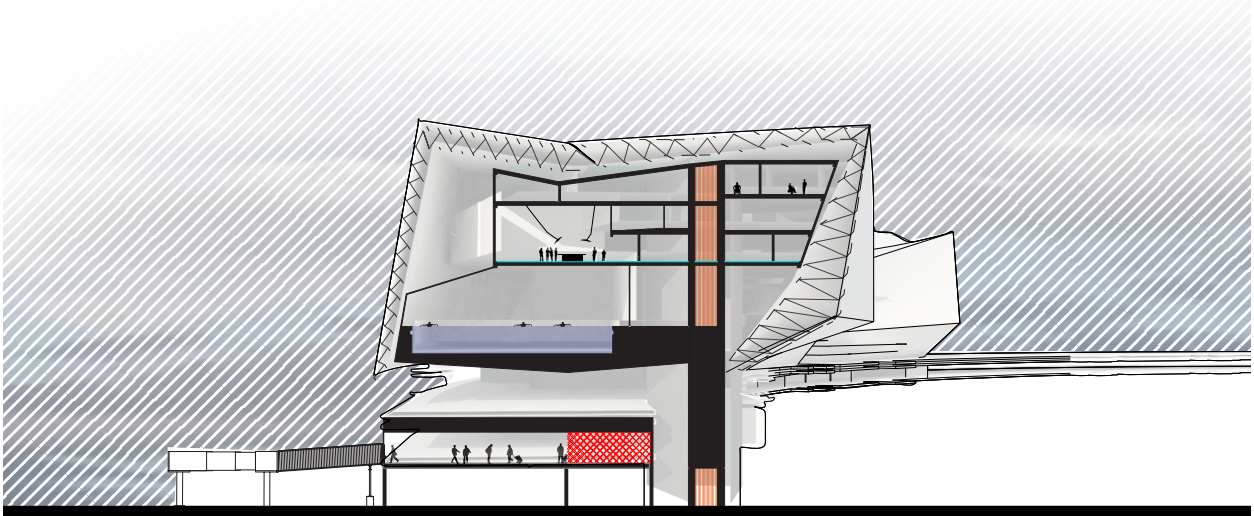
* please see appendix for enlarged plans and sections

The plan of the expanded terminal mimics that of the terminal on which it sits. The building face remains taught at the airside boundary, but releases and oscillates at specific locations along the landside boundary to create pockets of exclusivity within the floor plate. The separate levels of the new building are defined by sloping and ramped floor plates. As the building is traversed longitudinally, these floors pinch to form smaller, more intimate zones at one end of the building. They then expand to create vast rooms that house larger program at the opposite end. The center of the building is characterized by even floor plates, as the sloping planes pass one another. It is here that the separate layers of the building can be read and experienced visually through the atrium spaces.



section D

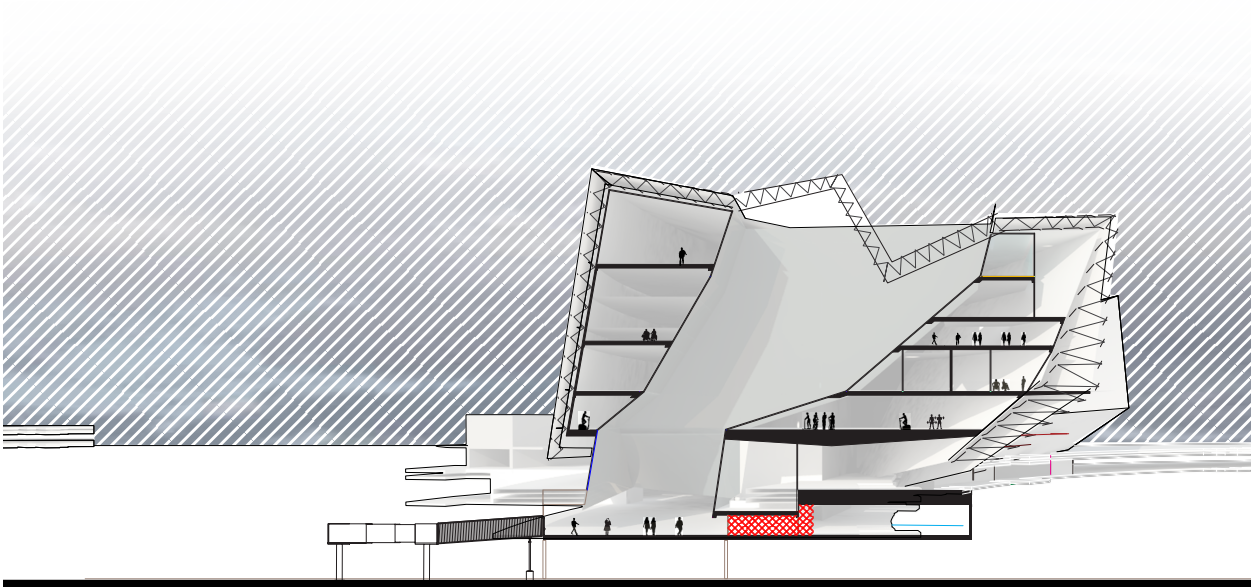
0′ 10′ 30′ 60′



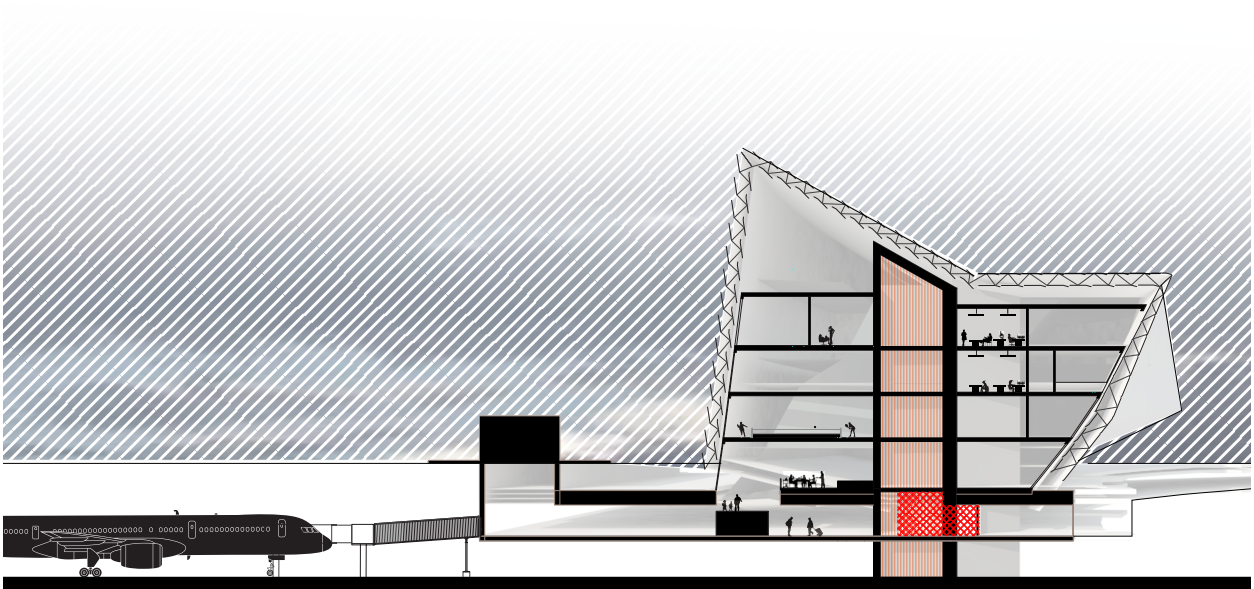
section A

0′ 5′ 15′ 30′

* please see appendix for enlarged plans and sections



section B

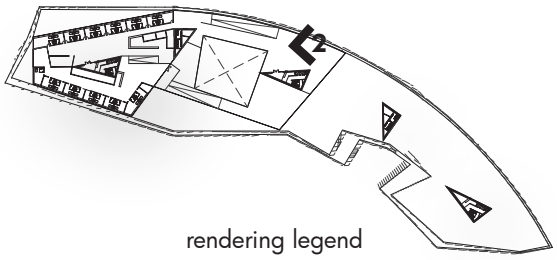


section C

0′ 5′ 15′ 30′

* please see appendix for enlarged plans and sections

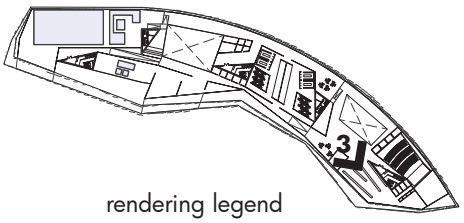
Rendering 2
The roof garden pictured here is located on level 5 at the top of an atrium and adjacent to patient recovery rooms.



rendering legend

Rendering 3

Pictured here is a dialysis spa that is situated on level 3 in a pinched floor plate condition. Programs normally kept separate, but similar in security and time requirements, are combined and overlapped on one floor.



rendering legend

The protective skin that surrounds the Expanded Airport Hub is comprised of a doubly layered, perforated metal panel system that absorbs and redirects sound. The shape and perforation of the metal panels are modified as they travel along the length of the exterior facade. The size of the panel aperture adjusts to match the sun angle, while the angle of the metal panel is dictated by its relationship to the adjacent runway. As the form of the building moves closer to or father away from the runway, the interior spaces are either isolated by a thickened zone or opened to receive more sunlight, respectively.

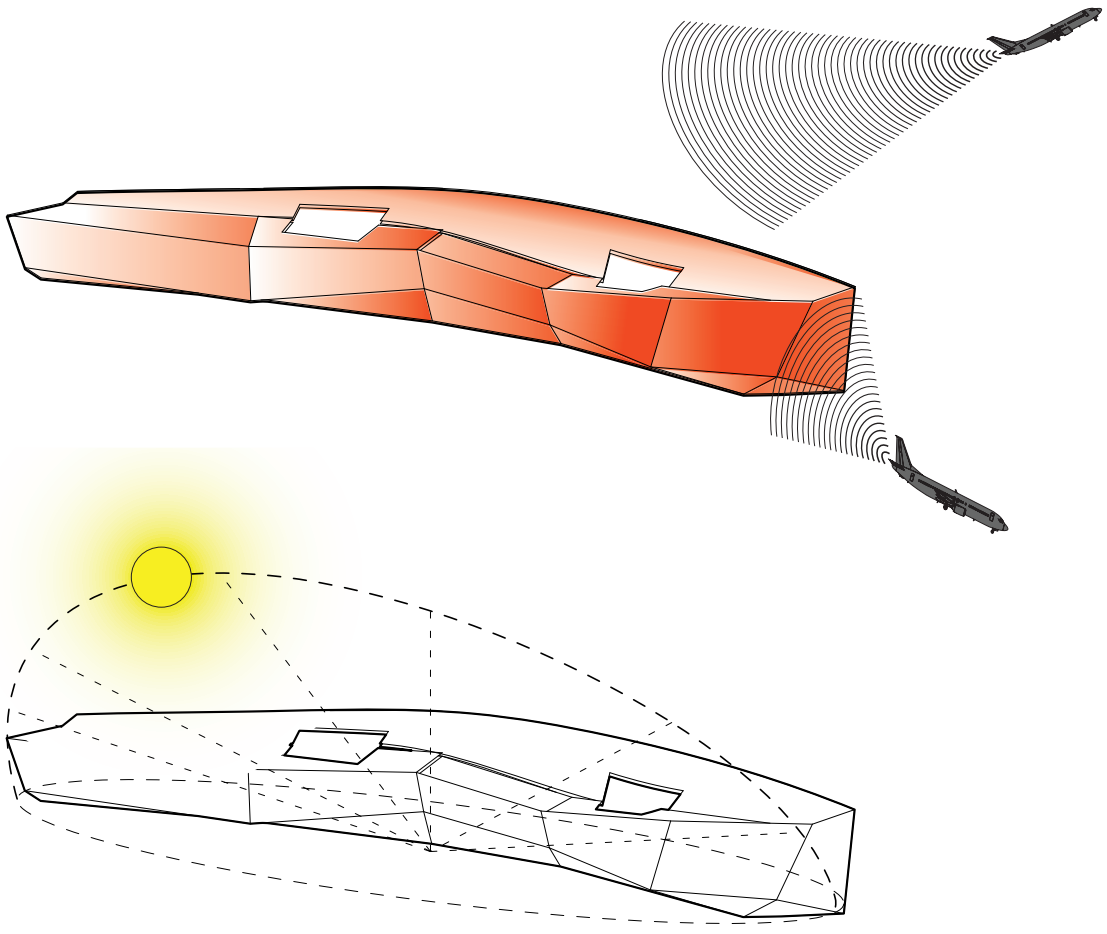


Figure 16
In the top diagram, the zones covered in a deep red color indicate areas that require greater sound protection due to their proximity to runways. The lower diagram indicates the path of the sun with a dashed line, which signals the need for greater shading on the inner, southern-facing radius of the building.

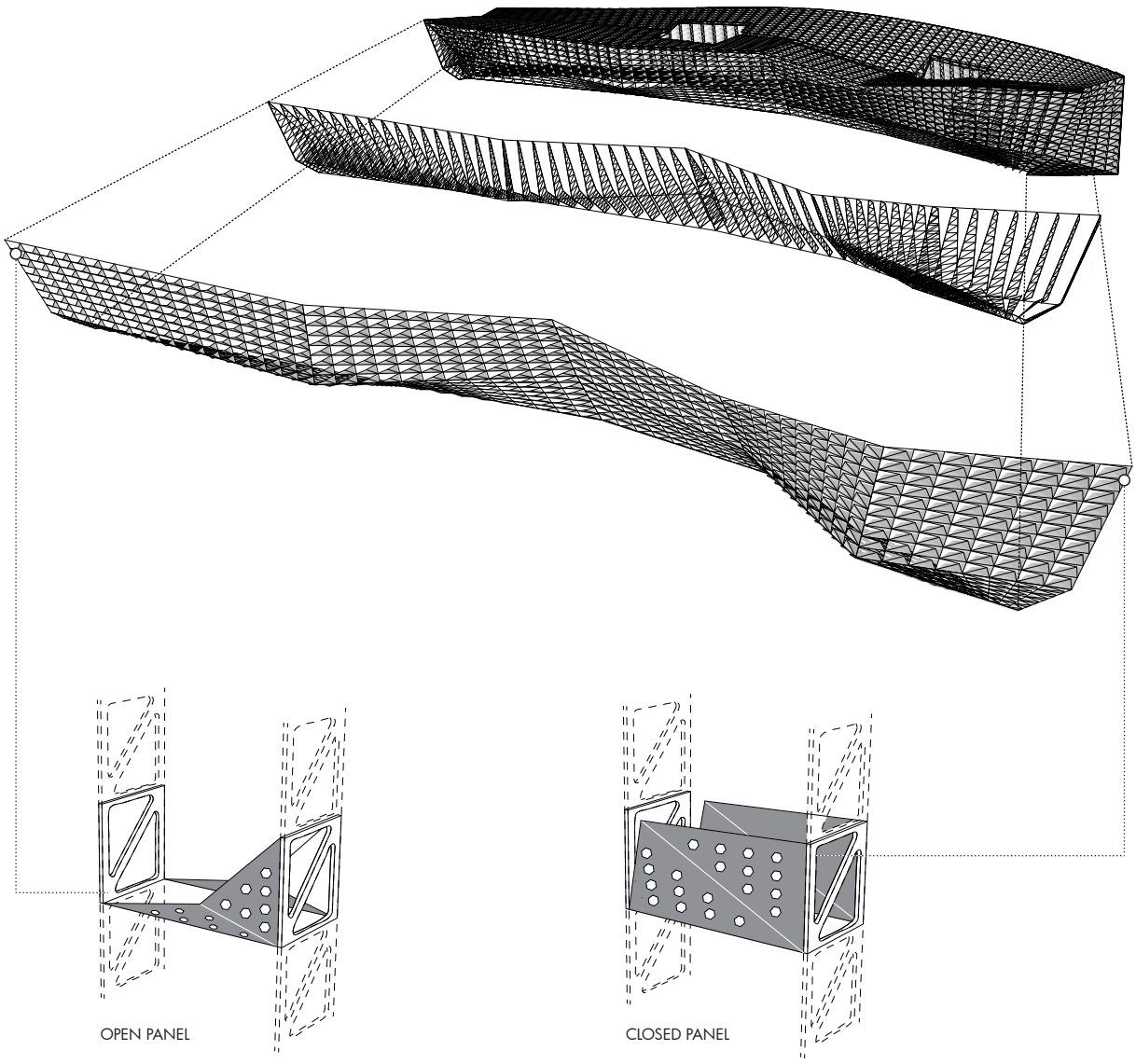
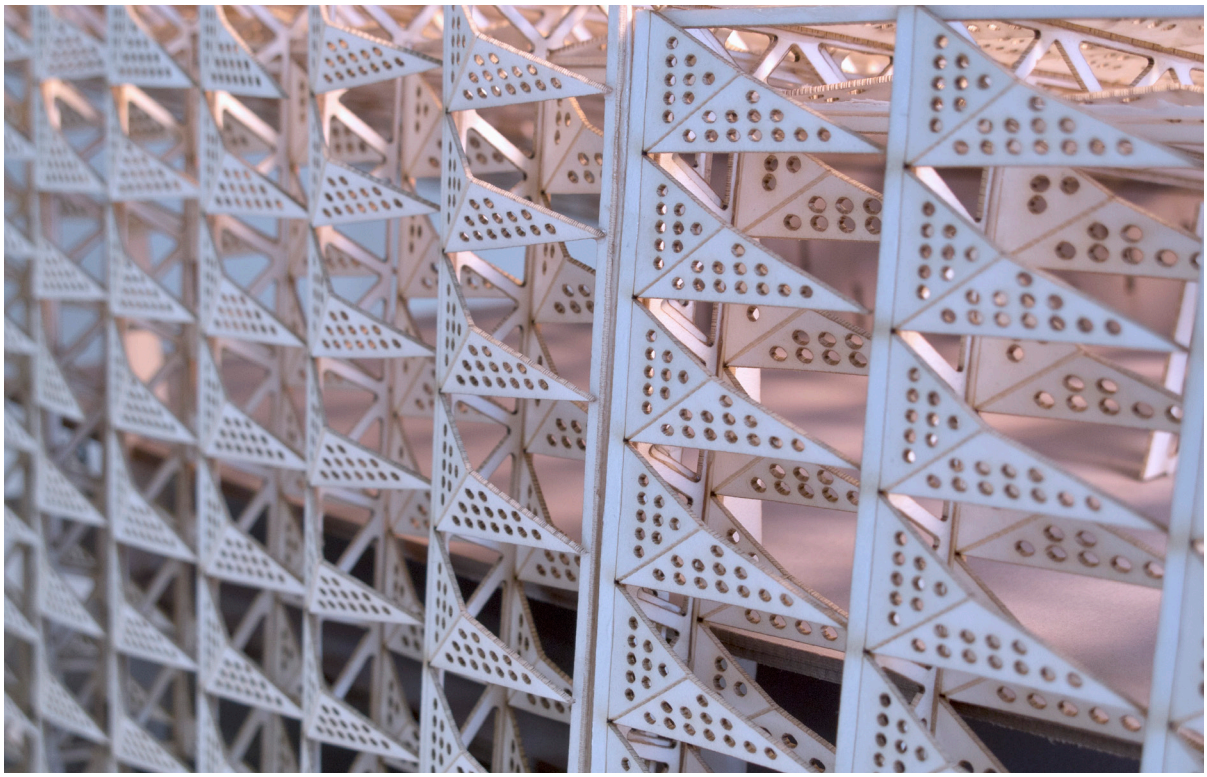
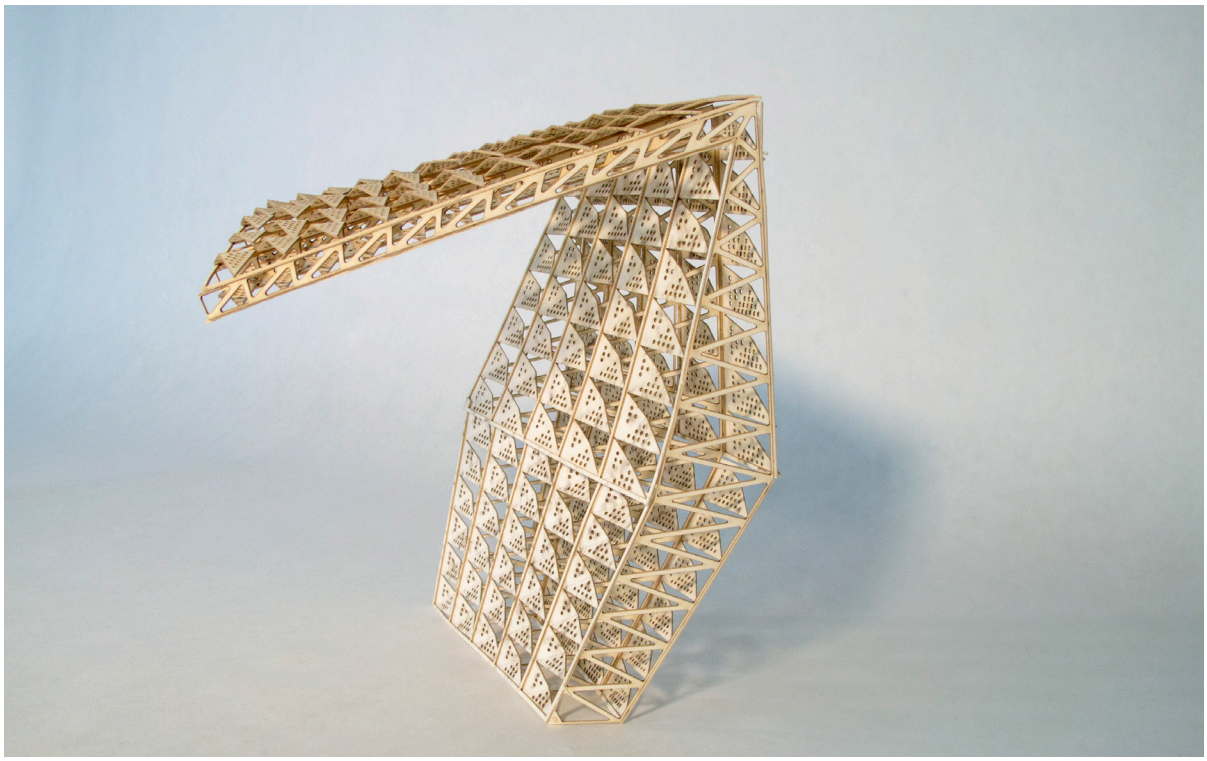
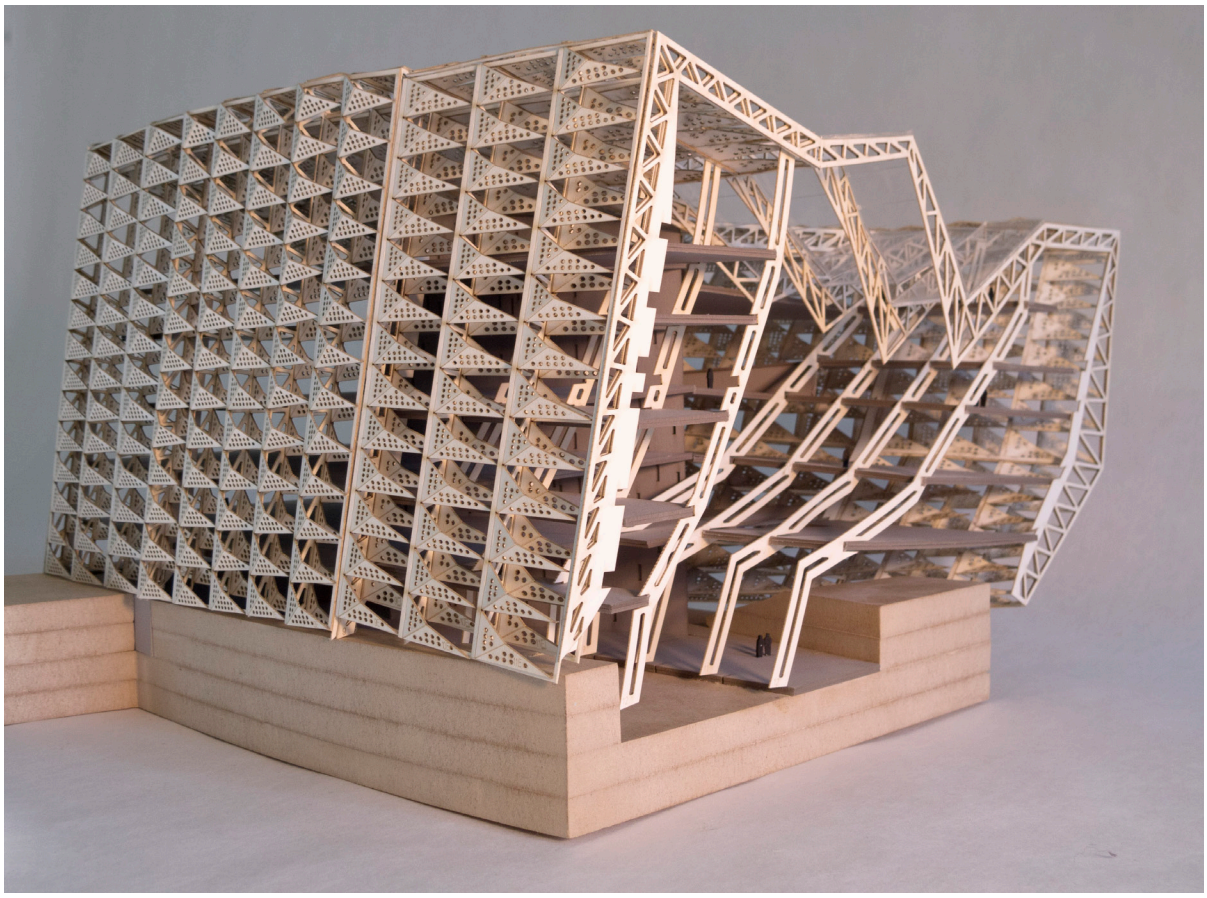


Figure 17
The exploded axonometric above shows the double layered skin system that encases the terminal expansion. Directly above are single panel diagrams of the basic system components in their most open and most closed state. The level to which the skin is open results as a response to the location of the adjacent runway and the sun path. As illustrated in the exploded axonometric, the northwestern end of the building incorporates skin in its most open state, while the southeastern end of the building integrates skin in its most closed state.

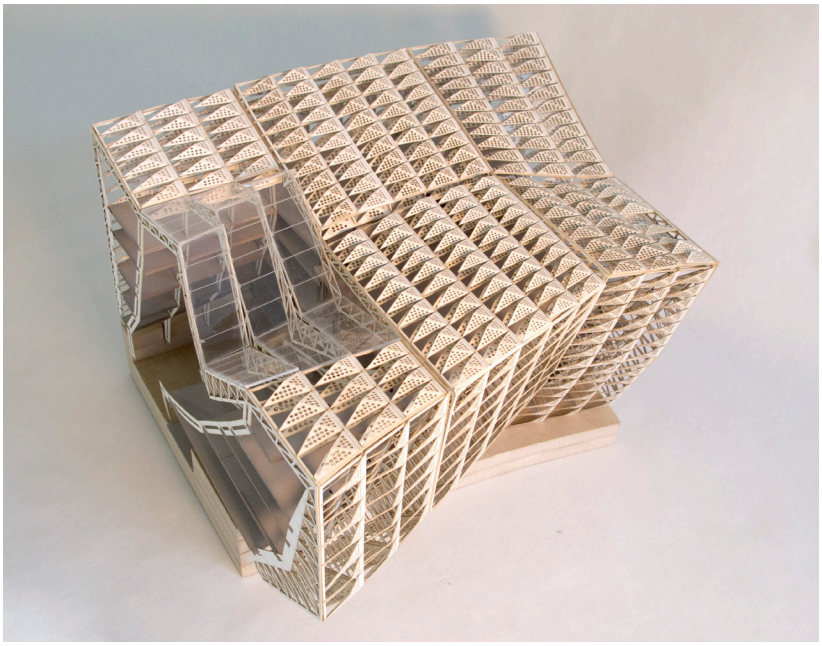


Above and Below
The physical model photographs display the detailed double facade system.

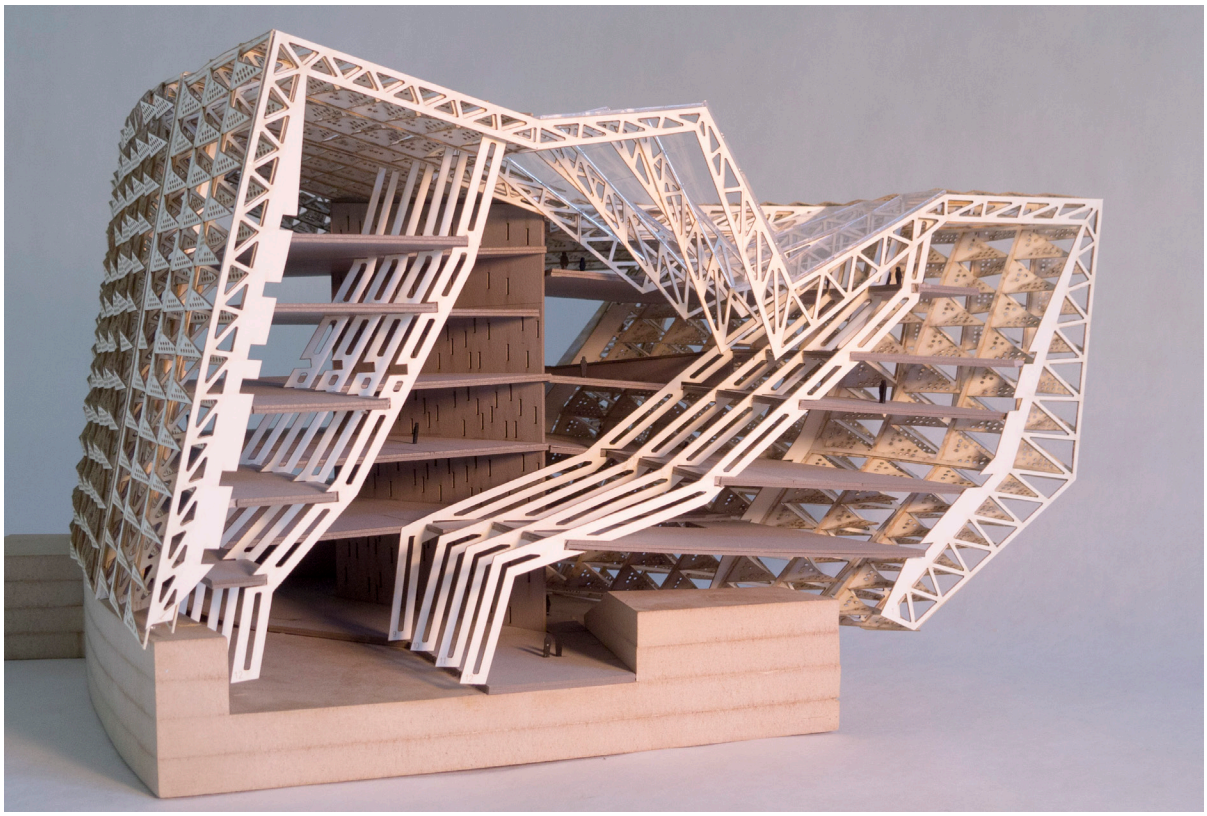




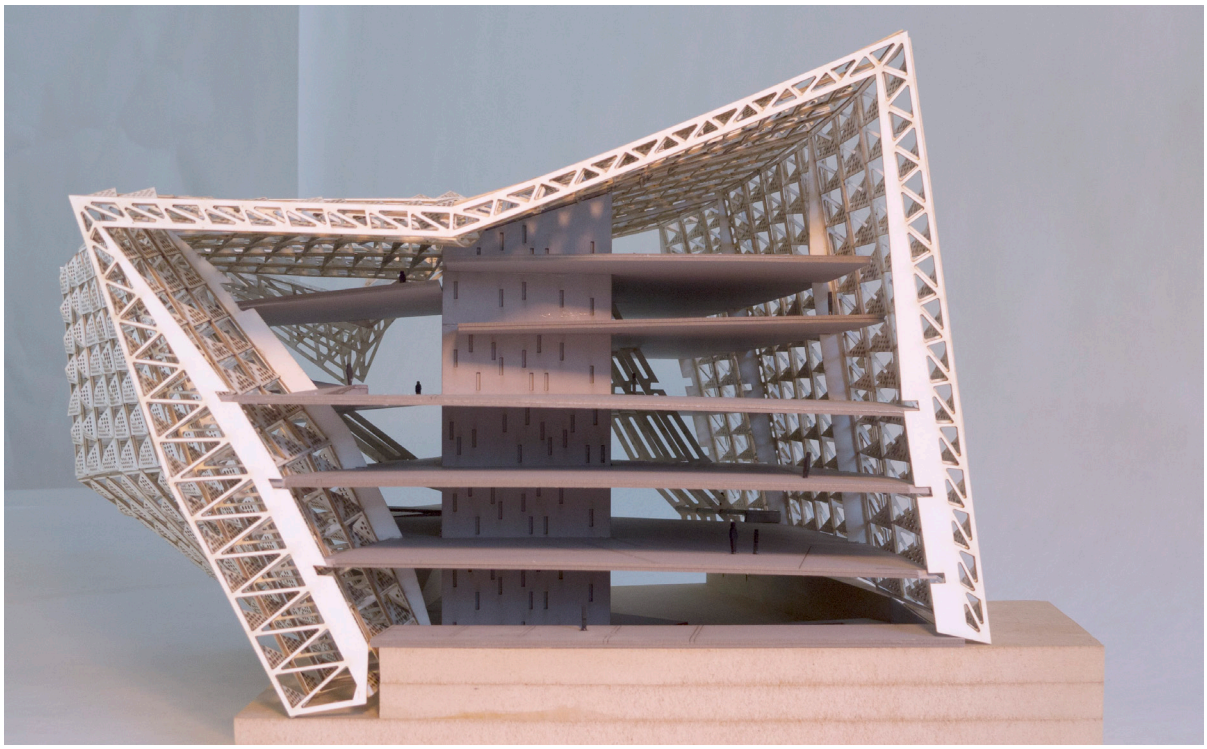
Above and Right:
Pictured here is a sectional model of the Expanded Airport Hub's floor plates and skin system. The mass of the existing Terminal C is rendered in medium density fiberboard.

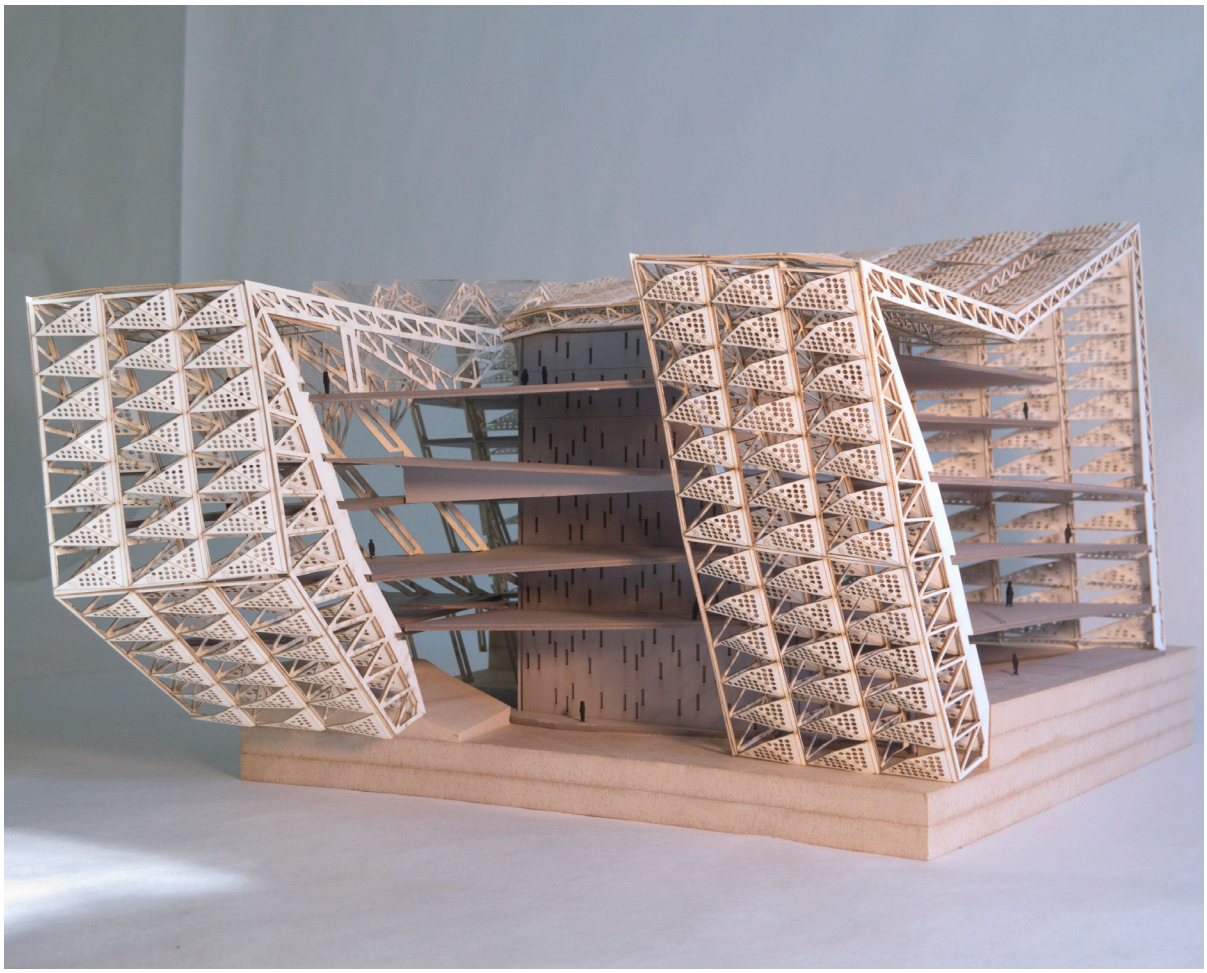


Above:
The photograph above provides a close-up of the sectional model of the Expanded Airport Hub's floor plates and skin system at one of the atrium skylight conditions.



Above and Below:
In this sectional model the floor plates, skin system and structural security column are visible.





Above:
In this photograph a portion of doubly layered skin system has been removed from the sectional model to expose a structural security column beyond.

BIBLIOGRAPHY

Assistant Administrator for Financial Services. *Administrator's Fact Book*. Department of Transportation, Federal Aviation Administration n.d. <http://www.faa.gov/about/office_org/headquarters_offices/aba/admin_factbook/> (March 2011).

Augé, Marc. *Non-Places: An Introduction to an Anthropology of Supermodernity*, J Howe trans (London: Verso, 1995).

Berger, Alan and Waldheim, Charles. "Logistics Landscape." *Landscape Journal* 27 (2008): 219-246.

Center for Hearing and Communication. "Common Environmental Noise Levels Factsheet" *Noise Center* n.d. <http://www.chchearing.org/noise-center-home/facts-noise/common-environmental-noise-levels> (2012).

Cheng, Irene, ed. *Active Design Guidelines - Promoting Physical Activity and Health in Design.* (New York: City of New York, 2010).

Dallas Fort Worth International Airport. "DFW Fast Facts" *Visitors Guide* n.d. <http://www.dfwairport.com/visitor/P1_009559.php> (2012).

Easterling, Keller. "Fresh Field" *Pamphlet Architecture 30: Coupling - Strategies for Infrastructural Opportunism.* (New York: Princeton Architectural Press, 2011) 10-11.

Fuller, Gillian and Harley, Ross. *Aviopolis: A Book About Airports*. (London: Black Dog Publishing, 2004).

Johnson, Linda A. "Americans look abroad to save on health care - medical tourism could jump tenfold in next decade" *Associated Press* n.d. <http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2008/08/03/BUGA121GPF.DTL&type=health> (3 August 2008).

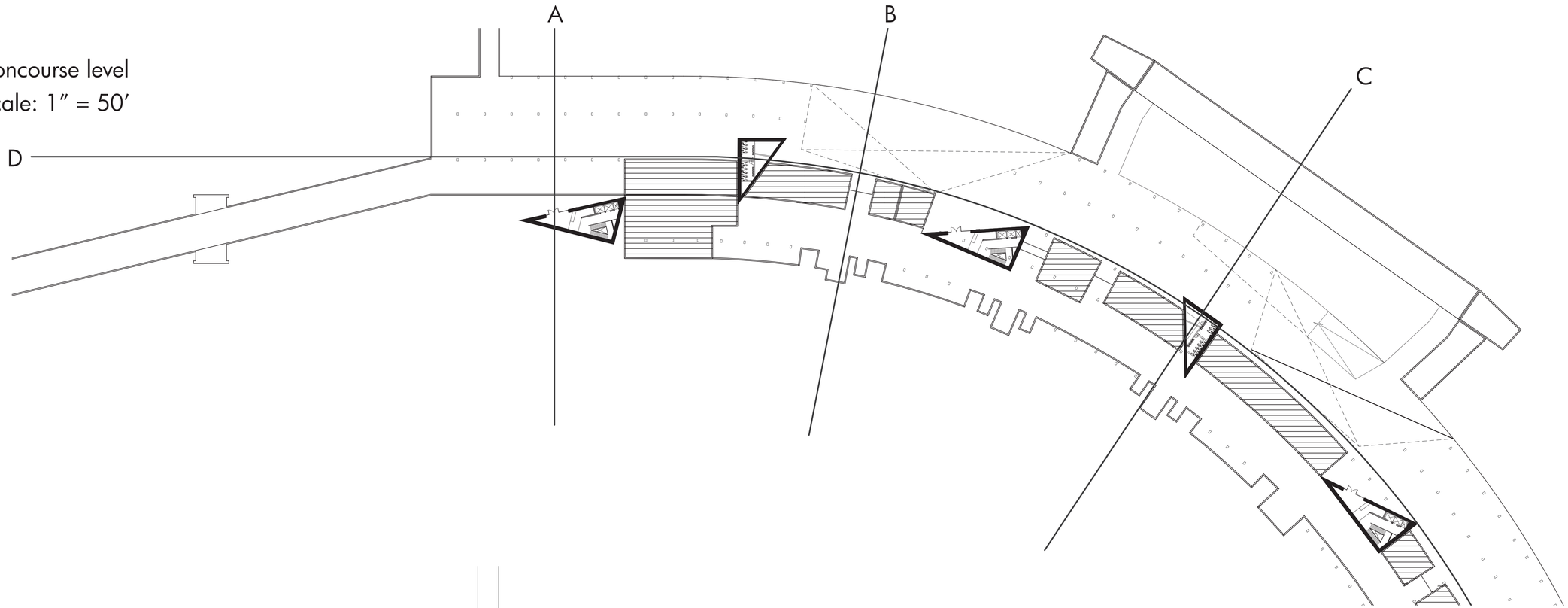
Lindsay, Greg and Kasarda, John D. *Aerotropolis: the way we'll live next*. (New York: Farrar, Strauss and Giroux, 2011).

Russell, James. "Terminal D Dallas/Fort Worth Dallas, Tx," *Architectural Record* 193, no. 10 (2005): 166-171.

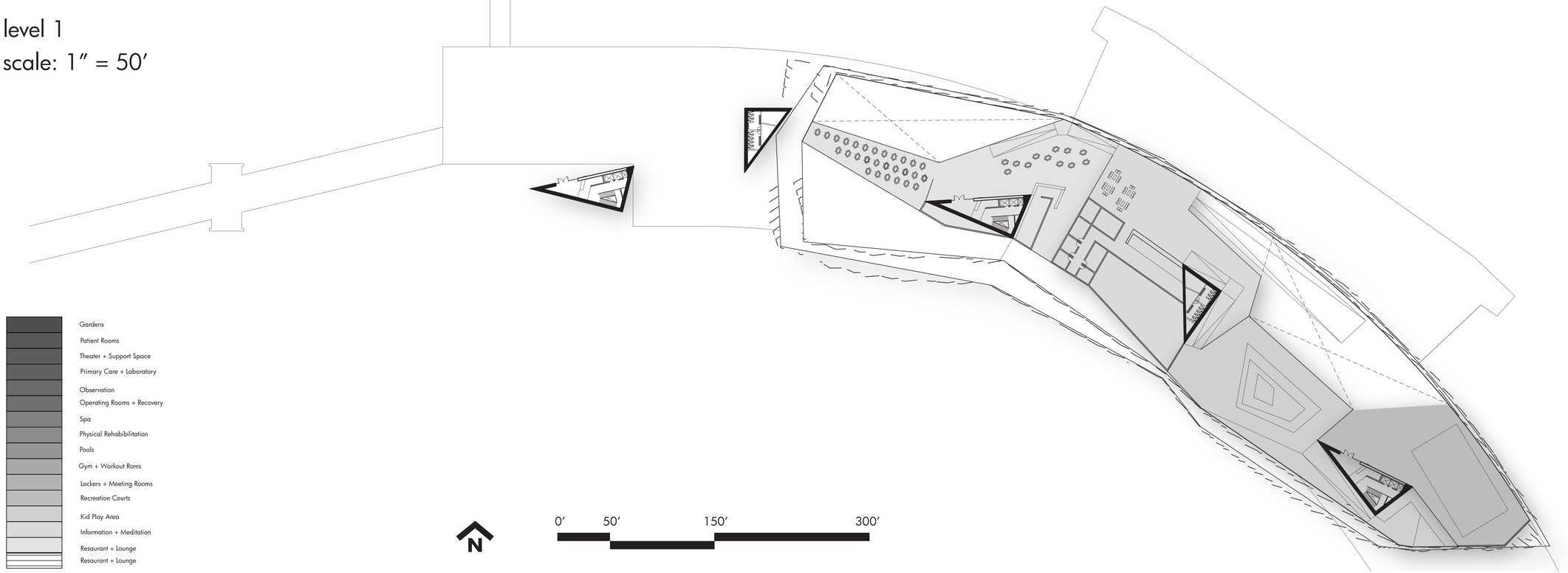
Van Dusen, Allison. "U.S. Hospitals Worth The Trip" *Forbes.com* n.d. <http://www.forbes.com/2008/05/25/health-hospitals-care-forbeslife-cx_avd_outsourcing08_0529healthoutsourcing.html> (29 May 2008).

Virilio, Paul and Lotringer, Sylvere. *Pure War*. (New York: semiotext(e), 1983).

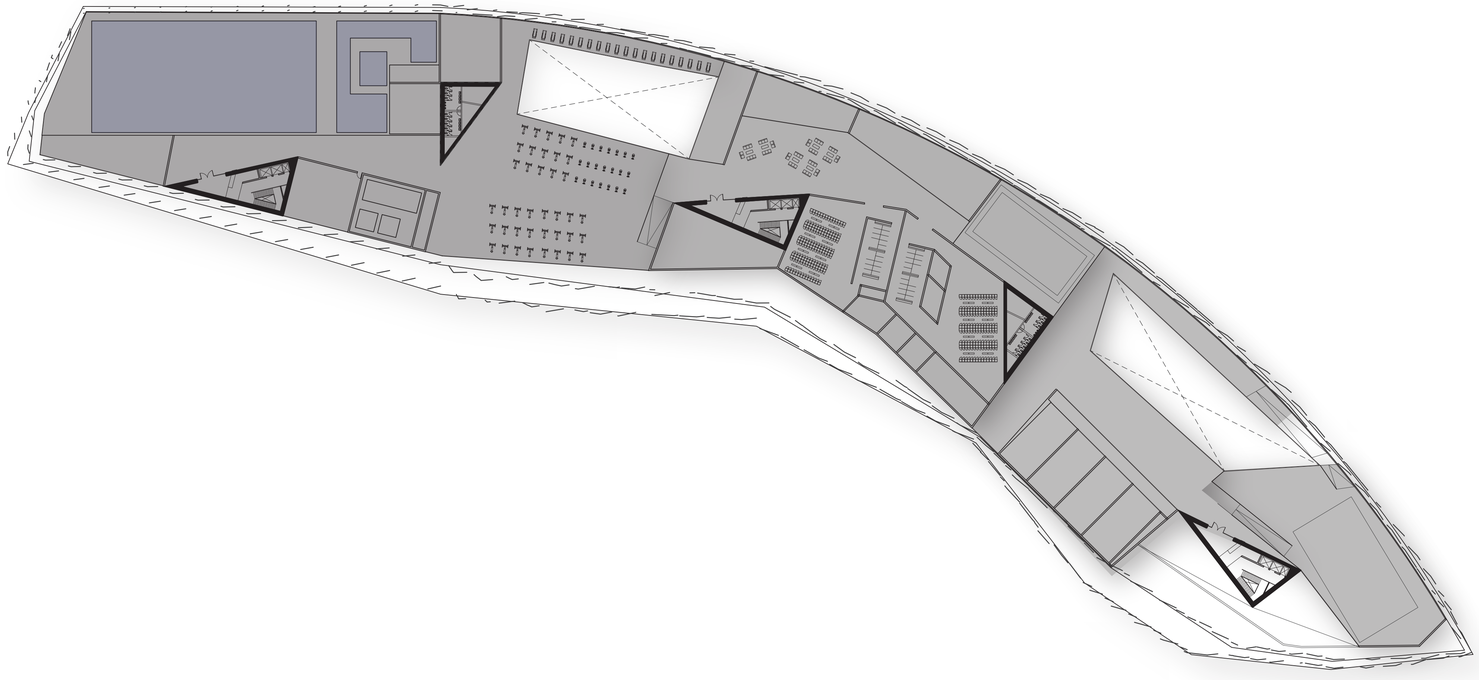
concourse level
scale: 1″ = 50′



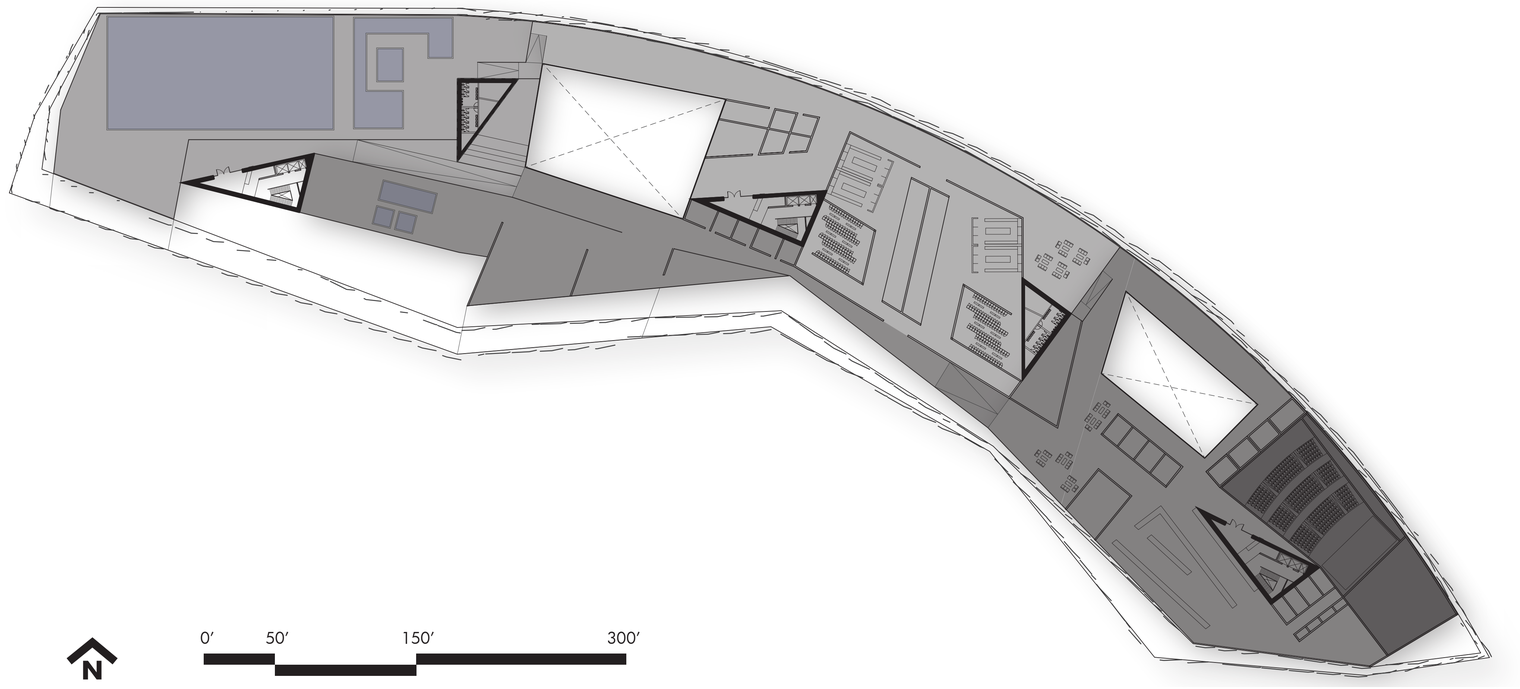
level 1
scale: 1″ = 50′



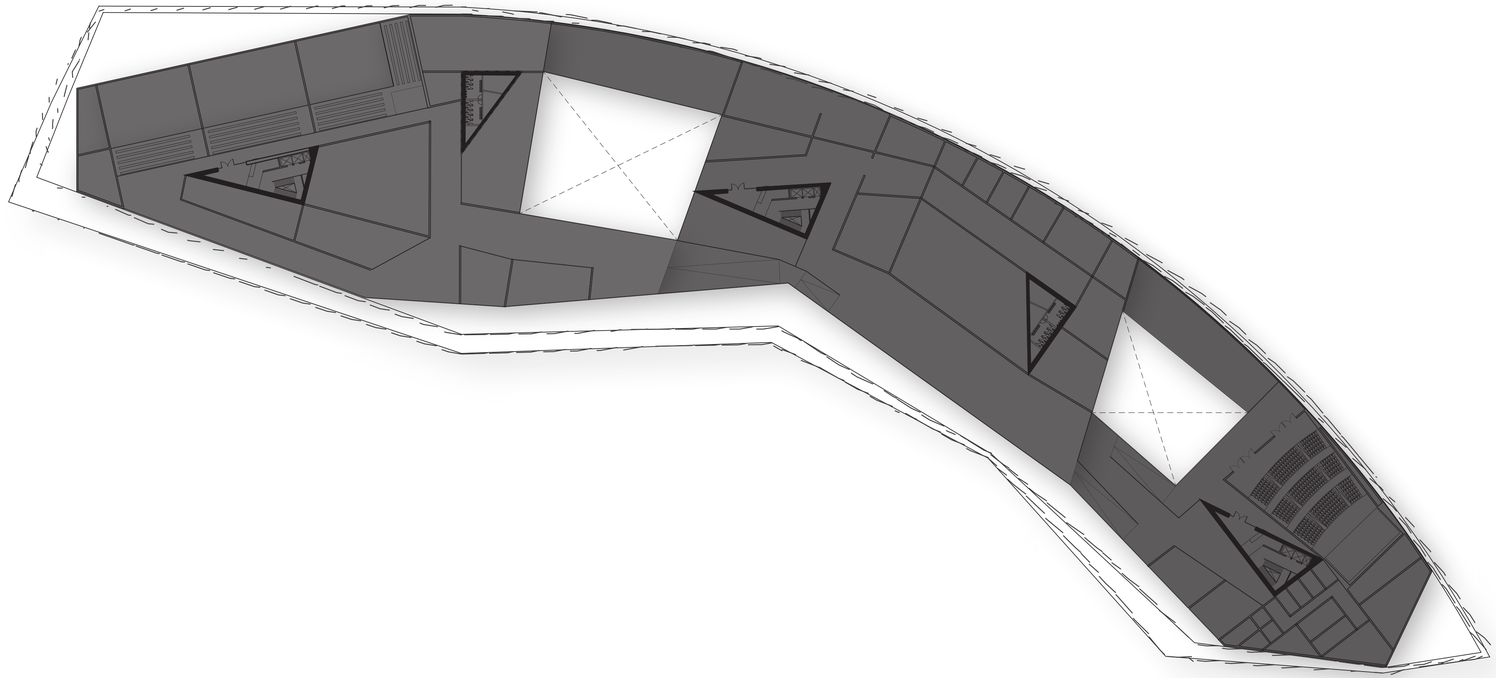
level 2
scale: 1″ = 50′



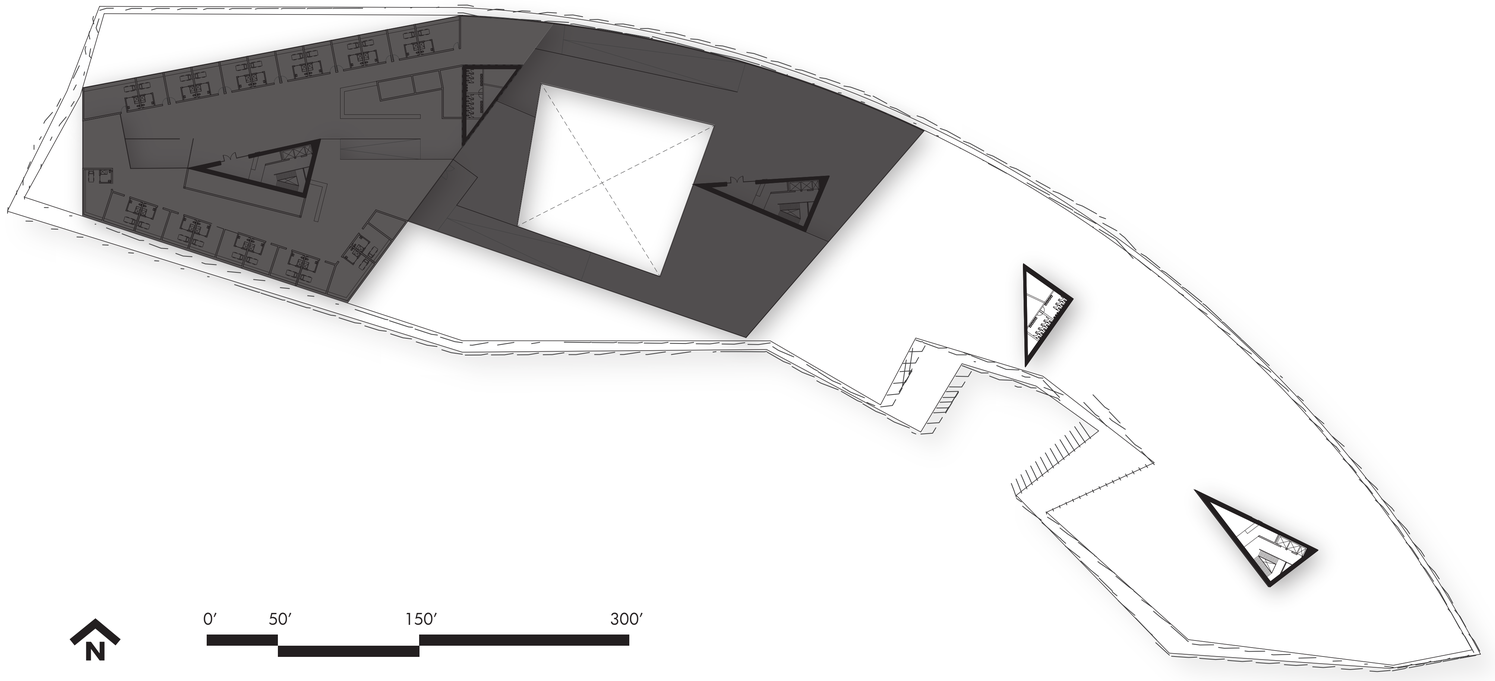
level 3
scale: 1″ = 50′

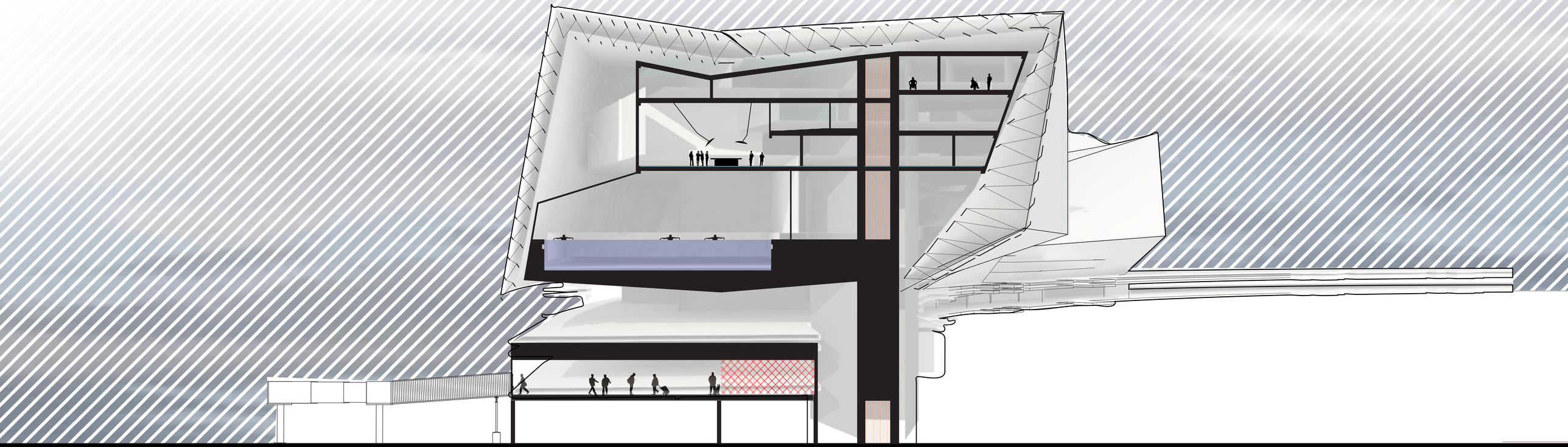


level 4
scale: 1″ = 50′



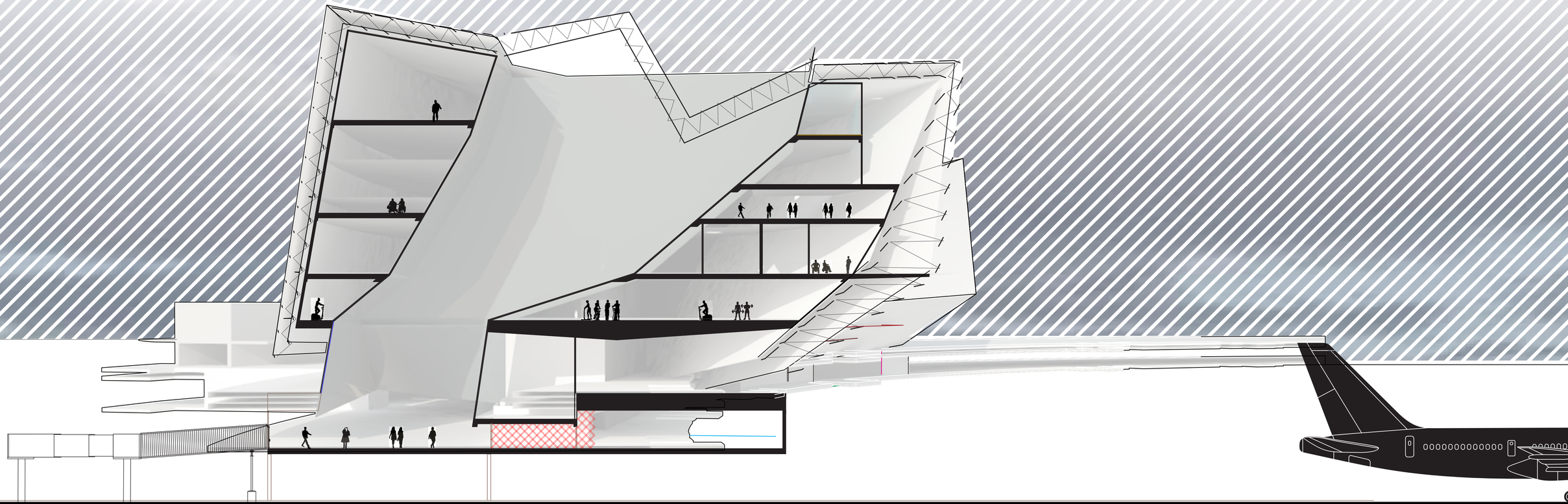
level 5
scale: 1″ = 50′





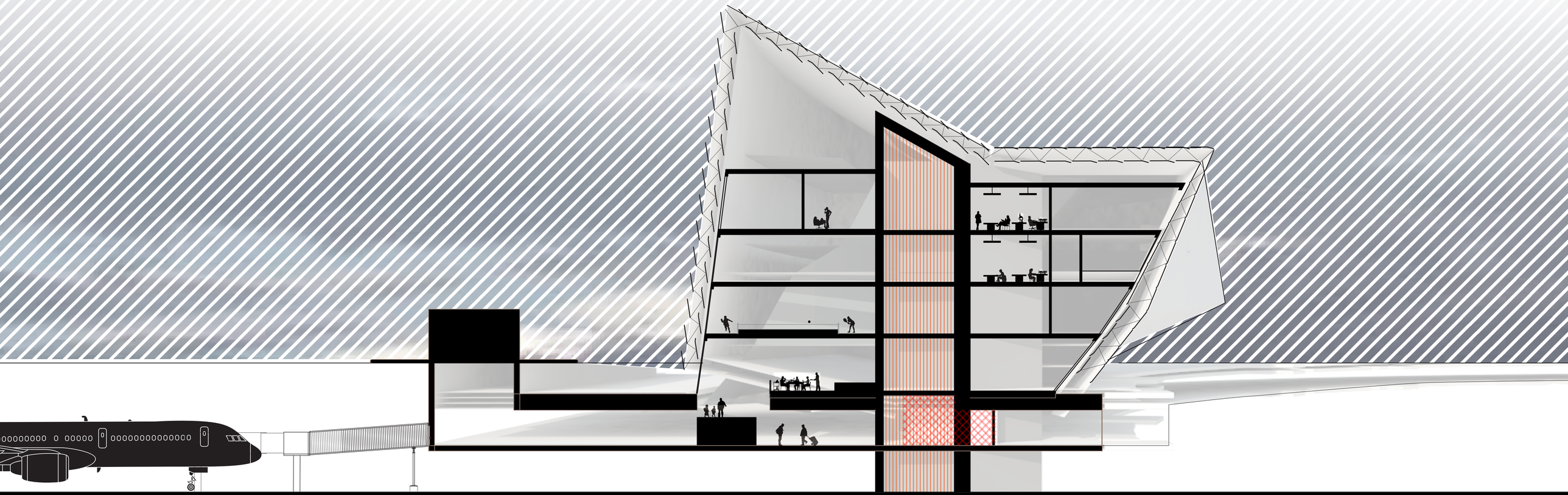
section A

0′ 5′ 15′ 30′



section B

0′ 5′ 15′ 30′



section C

0′ 5′ 15′ 30′